New Technologies to Help Seniors Age in Place

Researchers test ways to prevent elderly people from injuring themselves at home

By SHIRLEY S. WANG

How do you keep Grandma safe from falls without making her feel like someone's watching her every move?

As the population grows older in many parts of the world, engineers and health experts are searching for new ways to prevent elderly people from injuring themselves at home. In doing so, they hope to keep people in their homes longer, a concept known as aging in place.

The technology to help make this happen has improved. But researchers also must factor in whether seniors will be able to or willing to use the devices. Current methods include wearable alarms, which usually must be activated by the person after an injury, and optical devices, such as videocameras, that can be intrusive.

The technology "has to fit the cultural ethics of the aging population," says Cathy Bodine, a professor of bioengineering at the University of Colorado Denver. "We're not always taking that into consideration."

Falling is the leading cause of death by injury in those aged 65 and older, with 1 in 3 seniors falling each year. Falls can cause hip fractures and head wounds, increasing risk of earlier death, and induce fear that can reduce mobility, according to the Centers for Disease Control and Prevention. More than 72 million Americans—nearly 1 in 5—will be 65 and older by 2030, up from 1 in 8 in 2009, according to the government's Administration on Aging.

That has sparked scientists' quest to design better systems for getting help quickly to elderly people who have fallen. They're also working to find ways to prevent the falls in the first place.
Some researchers are studying how to adapt radar technology, which has been used for years to catch highway speeders and in weather forecasting, to applications for assisted living. Others are testing the 3-D sensors used in gaming systems like the Xbox to develop nonintrusive alert systems.

Urban radar has been used by the military to find and observe people hidden in buildings from a distance. The goal with the elderly is to detect a fall without disturbing them unless they have just fallen. "The whole idea is you cannot have visual access to inside," says Moeness Amin, director of the Center for Advanced Communications at Villanova University.

The radar sends and receives electromagnetic waves that reflect off people and objects inside a building at different frequencies and strengths. The reflected waves, which vary depending on whether the object is moving or still and the density and type of material, then return through the wall to the radar device.

By studying how the reflected waves differ, Dr. Amin's team aims to be able to tell if a person is simply sitting in a chair, tripping or collapsing from a heart attack. A big challenge is to figure out whether a person actually fell or whether it was a false alarm, like a pet jumping to the floor or a visiting grandchild flopping down in a chair.

To do that, scientists need to be able to program the system to distinguish between different actions. A first step is to model what a fall looks like. Simply gathering accurate information can be difficult, since researchers can't use real elderly people. Instead, they teach young, healthy people to walk and fall like seniors. Kelly Nestor, a colleague of Dr. Amin's and a clinical instructor in the Villanova adult geriatric nurse practitioner program, coached her college-student models by telling them to observe elderly people in a grocery store and instructing them not to pick up their feet while walking.

**Marjorie Skubic, director of the Center for Eldercare and Rehabilitation Technology at the University of Missouri, and her colleague, nursing professor Marilyn Rantz, have created an alert system using a combination of motion sensors, radar and sensors that gather depth information to produce 3-D images of people.**

The system is in use in a residential-care facility, TigerPlace in Columbia, Mo., and has demonstrated its effectiveness in detecting falls there. If a resident falls, staffers receive an email alert, along with a video clip that shows what's happened. (The image is a 3-D silhouette, which protects the patient's privacy.) Staffers can see whether the fall was serious and what happened leading up to it.

George Hage, a 90-year-old resident of TigerPlace, has had sensors set up throughout his apartment, including in the ceilings of each room, over the shower, in the refrigerator and kitchen cupboards and above the bed and under the mattress. Mounted sensors resemble residential fire alarms, while the bed sensors, filled with pressurized gas, sit in a strip under the mattress.
The bed sensors, some of which monitor his breathing and pulse rate in addition to motion, often pick up that he's a restless sleeper. So Mr. Hage will stop by the nursing station to tell them when he didn't sleep well and they shouldn't worry about him.

While many residents thought the sensors were intrusive, Mr. Hage, a retired postal inspector, says he's gotten used to them. "If [the research] is going to help somebody in the future, then I'm all for it."

Dr. Skubic and Dr. Rantz have also been using radar and 3-D sensors to measure speed, stride time and stride length among residents in TigerPlace apartments and using the information to calculate risk of falling. Studies have shown that people whose movement speed has slowed and whose strides are inconsistent, among other factors, are at greater risk of falling. The hope is that balance or strength training can be offered to these patients to prevent a serious fall. The researchers also plan to begin testing the feasibility of using the system in private homes.

The research team has also been testing mounted sensors that detect pulse, respiration and motion to predict health problems. A person making more trips to the bathroom than usual might be developing a urinary tract infection. Someone who spends longer sitting in a chair when they usually move from room to room might be getting depressed or struggling with mobility.

In another application under development, Dr. Bodine's team, at the University of Colorado Denver, has been testing a prototype of a system that monitors actions, such as how people put items like pills in a case. If someone puts the wrong medicines in the box, the sensor shows a picture of the correct pill and says, "Take a look at this picture. Try again."

The visual component uses an inexpensive digital camera and special software that can follow the hand and see if it is moving in the right direction for the right object.

Dr. Bodine says such technologies must be simple to use. They also must have a built-in backup plan, or redundancy, in case at first they fail. "The trick is to make them affordable enough, robust enough and redundant enough to be useful," she says.
Successful Investors Must Embrace Fears

Risk is an unavoidable part of daily life. Every time we drive a car, board a plane or engage in a favorite activity -- from pickup basketball to hang gliding -- we are dancing with some degree of risk.

Investing also is full of danger. And because there is no way to avoid risk, our best bet is to embrace it, says Robert O. Weagley, chair of the Personal Financial Planning Department at the University of Missouri in Columbia, Missouri.

Weagley says that properly diversifying your investments can mitigate risk over time. He also says that some strategies -- such as trying to time the market -- are doomed to fail.

In the following interview, Weagley offers his thoughts about the elements in a sound long-term investing strategy.

For risk-averse investors, how would you characterize the necessity of purchasing stocks and other risky investments to achieve their financial goals?

If one is truly risk averse, they need to learn that the best way to reduce risk is to embrace it. This sounds counterintuitive, but diversification across and within asset classes is one of the only things we "know" about achieving investment performance over the long run.

Many people only perceive the potential for a loss of principal as risk, but risk also includes opportunity costs, particularly a loss of purchasing power, if one does not achieve after-tax rates of return that exceed the rate of inflation.

All of the traditional non-diversifiable risks -- such as market risk, interest rate risk, exchange rate risk, inflation -- must be balanced across one's portfolio. We know they will each take their turn as the "winning risk" each year.

On the other hand, we can diversify away from business risk and financial risk by investing in the stock market through mutual funds, preferably index funds or (exchange-traded funds) for most investors.
In your opinion, do individual investors accurately assess the importance of accumulating retirement assets?

No! The average household in America is woefully unprepared to accurately calculate this number, and even less prepared to have the discipline to save for their retirement.

What is the single biggest mistake you see individual investors make?

Believing they can time the market, as they inevitably sell after prices have come down quite a bit, and buy after prices have come back quite a bit. By the time they get on the bandwagon, the parade is about over.

Having a loyalty to the markets for risk -- perhaps weighting them differently at different stages of a household's financial life cycle over time, and riding the ups and downs -- will work over the long run. Timing markets is not possible, but having confidence in your plan is possible. Do what is possible.

What are the pros and cons of including international investments in an investor's portfolio?

Pros: Greater diversification, different rates of growth in different countries. Some countries' markets have been shown to be inefficient when they are frontier markets, and momentum can add to one's returns.

Cons: Political risks are much greater outside of North America and Europe. Exchange rate risk, where currency fluctuations can affect the value of your international investments, can add to or take from your realized return on your overseas investments.

What are the pros and cons of including real estate investments in an investor's portfolio?

Pros: Greater diversification, good place to use leverage in your investment (borrowed money), relatively good return over time.

Cons: Markets don't always go up. (This approach) should only be used after a solid base of conventional investments is in place. Many people mistakenly believe that you make money on real estate when you sell it. That is wrong. You make your money when you buy the property. That is the only time you have any control. Thus, having a liquid source of funds for the occasional buying opportunity is key.

What role should alternative investments play in an individual investor's portfolio?

Of course, this depends on what you call an alternative investment, as yesterday's alternative is today's mainstay. Investopedia defines alternative investments as (including) "hedge funds, managed futures, real estate, commodities and derivatives contracts." Most of these investments are for the wealthy -- those with a large base of traditional holdings.
Mizzou Advantage announces $3.8 million in awards for 45 research teams

Faculty fellow also is named.

By Ashley Jost

Tuesday, June 3, 2014 at 2:00 pm

Mizzou Advantage, an initiative that promotes interdisciplinary projects at the University of Missouri, announced some expansion efforts to cover several dozen research-based projects as well as the addition of a faculty fellow to oversee the program.

Yesterday, the initiative announced $3.8 million worth of awards to 45 teams of researchers. Every project Mizzou Advantage funds falls in one of four areas: food, media, sustainable energy and One Health/One Medicine.

This year's awards include research to prevent anterior cruciate ligament tears in young female athletes by using video game technology to develop screening software that will measure knee angles while jumping and landing. Funding also went toward an effort to study the potential use of 3-D visuals in the news.

This year's 45 awards were narrowed down from more than 100 applicants.

The increased focus on research-based projects backs MU's strategic plan to improve the university's rank in the Association of American Universities from No. 32 to No. 28 by 2018. The association is a prestigious organization that includes only 34 public universities.

"Each of these awards was evaluated, in part, on the potential to help us advance our goals on one or more of the measurements used by the AAU, which include faculty citations, number of prominent faculty on campus, faculty awards and memberships in national academies, and competitively funded federal research support," interim Provost Ken Dean said in a news release.
To help coordinate the needs of the different projects Mizzou Advantage funds, the program has brought on Jerry Frank, assistant professor of history, to serve as the faculty fellow.

Frank said his new role will focus on building on what Mizzou Advantage has done the past four years. Now that these awards have been given, his next step will be to go back through the books and look at what the program has done the past several years.

"We're going to look at our objectives and ask what's needed next," he said, adding that there is not a specific goal of when the next request for proposals for projects will be open.

Frank said he sees the job of Mizzou Advantage as a research incubator.

His goal is to continue identifying projects that have "the greatest potential and nurture them, so when it comes time to compete, they have a leg up. We want the ideas that are born here on campus to be supported here on campus."

Construction for Traditions Plaza will begin within a week

Tuesday, June 3, 2014 | 11:49 a.m. CDT
BY KATIE POHLMAN

COLUMBIA — Mel Carnahan Quadrangle, the land behind Tiger Plaza, will be home to the soon-to-be constructed Mizzou Alumni Association's Traditions Plaza.

The proposed plaza, located along Conley Avenue across from Jesse Hall and next to Reynolds Alumni Center, will be an outdoor amphitheater with tiered seating that students, faculty, staff and visitors can use for programming or as a gathering place, according to a university news release.

"The plaza will take up most if not all of the northernmost circle of the quad," University spokesman Nathan Hurst said. Mel Carnahan Quadrangle has four circles — the southernmost circle is adjacent to Rollins Street and the northernmost circle, the proposed site of Traditions Plaza, is adjacent to Conley Avenue.

Hurst said the plaza will cost about $1 million.
Construction will start in the next week and dedication of the plaza is slated for Oct. 24 during Homecoming weekend, according to the Alumni Association's website.

After the selling of engraved bricks for the Mizzou Legacy Walk outside Reynolds Alumni Center was a success, the idea for Traditions Plaza was formed. Mizzou Alumni Association Executive Director Todd McCubbin said. The Mizzou Legacy Walk was created to celebrate MU's 150th anniversary.

"(The Alumni Association) has been looking to do another project and we were hoping it could coincide with the 175th anniversary," he said, and a project that would allow more alumni to "leave their mark" on campus.

McCubbin said he believes the amphitheater will better utilize that area of the quad, as well.

A brick circle, called the "Mizzou Legacy Circle," at the southern end of the amphitheater will be reserved for alumni and friends who are part of multiple generations of MU students to buy engraved bricks. Alumni, students and recent graduates will be able to buy bricks that will make up the stage of the amphitheater, McCubbin said.

Other bricks that will be part of the stage and pillars will be engraved with MU traditions.

He said the Alumni Association wanted to offer students a chance to buy bricks so they could contribute to the amphitheater while still on campus, and there will also be a new 8-by-8 inch-bricks that donors can buy for the stage.

The project will be initially funded by the Alumni Association's reserved funds from membership fees and fundraising. Proceeds from the brick sales will also help pay for the rest of the project, McCubbin said. Bricks will be installed before Homecoming and before graduation every year, he said.

Extra brick sale proceeds will fund the association's student scholarship program.

Students and recent graduates can buy 4-by-8-inch bricks for $175. Bricks for Alumni Association members will be $375 and bricks for non-members will be $425. The larger
8-by-8-inch bricks will be $500 and $550 for Alumni Association members and non-members respectively, according to the association's website.

MU receives $120,000 gift from State Farm

By Maddie Foster

Like a good neighbor, State Farm Insurance is there for MU.

The company donated roughly $120,000 to the university on May 20, bringing the company’s total donations to MU up to $1.8 million.

The latest donation has been allocated to various MU programs, including initiatives providing elementary school students with tutors and training people to rescue others from burning vehicles.

The Fire Rescue and Training Institute received the $50,000 to fund the Vehicle Rescue Program.

The 16-hour course trains first responders to quickly and efficiently remove people from their cars after an accident.

“As fire and emergency responders in Missouri are called to the scene of approximately 74 highway-related incidents per day, they have the opportunity to reduce the severity of the incidents and prevent highway fatalities when effectively educated,” FRTI director David Hedrick said.

MU Health Care also received $30,000 to fund the Mobile Age-Older Adult Driving program.

The program has worked to reduce car crashes involving older drivers by spreading information and training material on the subject since its start in 2013.

“We recognize that most older adults are among the safest drivers on the road, but those with serious vision, cognitive or psychomotor impairments may face driving retirement,” Outreach Coordinator James Stowe said. “The focus of Mobile Age is to educate those groups of professionals on how individuals with impairments can maintain safe mobility throughout the life course.”

The College of Education’s Achieve Program was given $16,200, the smallest out of the four donations.
“The Achieve program pairs one MU College of Education pre-service teacher with one or two academically struggling elementary or middle school student(s) for an entire academic year,” said education professor Stephen Whitney, who co-founded the program.

This is the second donation the program has been awarded by State Farm. In 2013, the company gifted the program a grant that was used to expand the program to two additional schools.

“The most recent donation will ensure the continuation of the program, the development of assessments to help refine the program and to continue the development of training materials to help train MU students in the tutoring (and) mentoring approach the program utilizes,” Whitney said.

Another $22,000 was awarded to the Office of Financial Success, which provides one-on-one financial counseling for students, faculty and staff.

“Our mission is to improve the financial well being of individuals and families by helping people make positive changes in their lives,” said Ryan Law, director of the office and the Center for Economic Education.

Law said the donation will help fund the office’s operating expenses and outreach efforts.

According to State Farm’s spokesman Kevin Gamble, the company donated to MU because of shared interests and hopes to continue the partnership in the future.

“State Farm and MU have many shared goals and missions — chief among them is building safer, stronger and better-educated communities — and supporting MU’s work is a natural fit for State Farm,” Gamble said. “It’s really remarkable how many programs MU has and how much good they do for so many people. We are glad to be supporting MU and these great public services they provide.”

**Jesse and Swallow halls close while renovations take place**

By Libbye Tellor

**Jesse and Swallow halls will close for the upcoming school year as the Renew Mizzou renovations begin, and services and offices in the buildings are relocated.**

MU spokeswoman Jesslyn Chew said the Renew Mizzou project “calls for safety and access upgrades” with respect to Jesse Hall. Improvements include air conditioning, heating, ventilation, an alarm system, a sprinkler and a second elevator.
The construction in Jesse Hall is expected to run from this July to April 2015, displacing several key services from the building during that time.

However, Chew said services vital to students will remain close to the center of campus.

“It’s unlikely that students will be inconvenienced by the project because the critical student services will remain near the center of campus,” Chew said. “Offices such as Admissions, Cashiers, Financial Aid and Registrar whose employees frequently interact with current and prospective students will move to Ellis Library.”

According to Chew, Swallow Hall will close to install an upgraded modern interior, larger space for academic use and renovate the exterior brick.

The renovations in Swallow Hall will start in July and is expected to run until February of 2016.

The Museum of Anthropology, which is currently housed in Swallow Hall, will be moved to Mizzou North, where the Museum of Art and Archaeology was relocated due to the radiation concerns in Pickard Hall.

The decision to move the Museum of Art and Archaeology, which was made by former Vice Chancellor Jackie Jones, was heavily criticized for potential inconvenience and lack of input from faculty and students.

Feedback to moving the Museum of Anthropology from those in the Department of Anthropology, including Director of Graduate Studies Todd VanPool, appears to be more positive.

“We have had excellent support from the administration,” VanPool said.

VanPool said the move will only be a temporary inconvenience, and that the renovations would be useful for the department. He also said the project would also allow better collaboration between the Art History and Archaeology staff and the Department of Anthropology.

The staff in both museums will share an office suite at Mizzou North, and the renovated Swallow Hall will include both the Department of Anthropology and Department of Art History and Archaeology.

Vanpool said the reconstruction of Swallow Hall could have many benefits for the Department of Anthropology. The graduate students and faculty would benefit from additional high-quality laboratory spaces and a more comfortable building due to heating and cooling improvements, he said.

Michael O’Brien, College of Arts and Science dean and Museum of Anthropology director, said the museum will be able to provide the same research and education services it did in Swallow Hall, even in its new location.
O’Brien also said classes will continue to use the museum like before in the new location.

O’Brien said the new proximity of the museums could be beneficial to the public, by allowing for “vast anthropological and archeological holdings” to be housed at Mizzou North.

“I hope both the public and academic communities come to appreciate what I have referred to as one-stop museum shopping,” he said.

The project is projected to cost more than 21 million dollars and is funded mostly by campus savings and a part of Campus Facilities’ capital repair budget.