2024-2025
Grade 12 NTI Day #9 ELA
Teacher: Mrs. Lee
Text:
<u>Against a snowy death: predicting avalanches with self-driving car tech</u>
By Ethan Baron, The Mercury News, Tribune Content Agency

Assignment Instruction:
- Task 1 – Read and Annotate the Article
  - Underline key ideas and details
  - Make notes in the margin every couple of paragraphs – write a summary or ask a question

- Task 2 – Complete the Writing Prompt – Short paragraph

- Task 3 – Complete the text dependent questions (1-4).

Important:
This assignment will also be available in Google Classroom. Please feel free to contact Mrs. Lee with any questions via email: andrea.lee@pineville.kyschools.us

Against a snowy death: predicting avalanches with self-driving car tech

By Ethan Baron, The Mercury News, Tribune Content Agency on 02.28.17

Word Count **985**

Level **MAX**

Bay Area technology lawyer and backcountry skier Bill Wang tests the snowpack near Lake Tahoe for weak layers that could cause an avalanche, part of a hands-on safety protocol now getting a boost from rapid technological advances. Photo: Ethan Baron/Bay Area News Group/TNS

It's a bountiful winter in the snowy Sierra Nevada, with the biggest snowpack in 22 years. That's great news for skiers and snowboarders, but all that snow can transform in an instant from a beautiful blanket to a deadly shroud when an avalanche hits.

In December, doctor Tom Barker, 64, was swept more than 200 yards in an avalanche that left him buried under 9 feet of snow, after he and a friend skied into a closed area at the Mt. Rose ski resort near Lake Tahoe without their avalanche-safety gear. Barker did not survive.

Slides kill one or two winter-wilderness travelers every couple of years in the Sierras around Lake Tahoe. For every death, avalanche experts say, about 10 people are caught in a cascade of snow

and ice and barely escape with their lives.

As the backcountry becomes an increasingly popular winter destination — activities outside the bounds of ski resorts rose 21 percent in the U.S. last winter, according to Snowsports Industries America — the likelihood of tragedy has grown.

That popularity, and the risk, are driving companies to develop new avalanche-safety products based on bleeding-edge technology better known in the fast-evolving realms of self-driving cars, the Internet of things, and big-data computing. The technology holds promise for preventing fatalities, according to experts, but it's in its infancy.

"Everyone wants the avalanche goggles that you can just look everywhere and see whether it's safe or not — I don't think we're ever going to get there," said Jeffrey Deems, a research scientist at the National Snow and Ice Data Center in Colorado. "But we can start to create new observations that help us get a better view of how the snowpack varies across the terrain."

One method for making those observations uses Lidar, the laser-based system used by some self-driving cars to gauge distance. With this equipment, avalanche forecasters can measure the snow depth at a known avalanche starting point — one of the best but most dangerous spots for assessing slide risk — from more than 1,000 yards away, Deems said.

Without Lidar, judging the snowpack in an avalanche zone involves measuring it elsewhere and estimating depth at the starting point, he said.

"There's quite a lot of uncertainty associated with that," Deems said. "This new technology allows us to really see the pattern of snow accumulation."

Another relatively new high-tech tool for predicting avalanches is a "smart" probe by Mountain Hub that's inserted into the snowpack and uses built-in pressure and depth sensors to identify problematic layers, such as ice from which the snow on top could slide, or large crystals that could crumble under pressure, leading to the same result.

Information on snow layers can be uploaded to a database to help avalanche forecasters track the presence of weak or slippery sheets buried across a landscape.

However, while new developments in avalanche-safety tech such as the smart probe and Lidar may pay off in saved lives in the future, they're not all that useful yet, argued Brandon Schwartz, lead avalanche forecaster for the Sierra Avalanche Center, a nonprofit partner of the U.S. Forest Service, which puts out daily slide-hazard bulletins.

The Lidar system, at about $200,000, is prohibitively expensive for many forecasters whose agencies rely on government funding and donations as well as for many safety teams that use explosives to blast potential avalanche areas near highways, railroads and in ski resorts to create controlled slides, Schwartz said. And that system can't reveal the level of detail in the snowpack's layering that Schwartz and his colleagues need, he said.

Mountain Hub's probe, the $1,500 Avatech SP2, has accuracy issues and "is not that great, unfortunately," Schwartz said. "It's not really there yet as a tool that has enough worth to be in widespread use."

Both systems have potential to evolve and prove useful for analyzing the snowpack and producing large data sets that could add detail and scale to the forecasting process, Schwartz added.

Mountain Hub marketing director TJ Kolanko acknowledged the SP2's deficiencies but said the company was working to improve its technology. This fall, it plans to launch the consumer-oriented Avatech Scope, a "smart" ski pole that has a pressure sensor in the tip and a depth sensor on the shaft. The gadget will cost $499 and will come with a second, standard ski pole.

As the Scope is pushed into the snow, the pressure sensor measures hardness and sends the data through an algorithm that translates it into types of snow layers, while the other sensor tracks the depth, to build a virtual picture of the snowpack.

This is where the big-data analysis beloved across today's business world comes in, along with the Internet of things. Information collected by individual users, who can easily perform multiple assessments in a number of locations, will be uploaded to the Mountain Hub platform. There, it can be analyzed in conjunction with data about snowpack conditions, weather and avalanche activity to predict avalanche hazard through a crowd-sourced "culture of contribution," Kolanko said.

Still, as promising as the new avalanche forecasting technologies may be, traditional tools, including beacons, probes and shovels, and training in skills such as snowpack testing and forecast analysis remain vital to help prevent tragedies, experts say.

In January, for example, an avalanche caught pro extreme skier JT Holmes in the Tahoe wilderness between the resorts of Squaw Valley and Sugar Bowl, carried him over a 30-foot cliff and buried him face down, 6 feet under. Four companions located him by the signal of his safety beacon and dug him out. He was back on his skis minutes later.

Avalanche-safety instructor John Littleton of Alpine Skills International in Truckee said more often than not when he's in the backcountry he encounters people without proper safety skills and gear.

"The human element just assumes that, 'We're going to be safe,'" said Littleton. "Get the education and get the equipment."

Write Prompt

Write a short paragraph that explains the central idea of the article. Use at least two details from the article to support your response.

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Quiz

1   Read the selection from the article.

> *The Lidar system, at about $200,000, is prohibitively expensive for many forecasters whose agencies rely on government funding and donations as well as for many safety teams that use explosives to blast potential avalanche areas near highways, railroads and in ski resorts to create controlled slides, Schwartz said. And that system can't reveal the level of detail in the snowpack's layering that Schwartz and his colleagues need, he said.*

Which of the following conclusions can be drawn from this selection?

(A)   The Lidar system is well worth the high cost associated with it.

(B)   The Lidar system will help forecasters predict future avalanches.

(C)   The Lidar system is not a very useful tool for avalanche forecasters.

(D)   The Lidar system will save many lives in the future.

2   Read the sentence from the first paragraph of the article.

> *It's a bountiful winter in the snowy Sierra Nevada, with the biggest snowpack in 22 years.*

Which version of this sentence creates a more dramatic tone by replacing the word "bountiful"?

(A)   It's a PLENTIFUL winter in the snowy Sierra Nevada, with the biggest snowpack in 22 years.

(B)   It's a PROLIFIC winter in the snowy Sierra Nevada, with the biggest snowpack in 22 years.

(C)   It's a RELENTLESS winter in the snowy Sierra Nevada, with the biggest snowpack in 22 years.

(D)   It's a GENEROUS winter in the snowy Sierra Nevada, with the biggest snowpack in 22 years.

3   Read the sentence from the article.

> *The technology holds promise for preventing fatalities, according to experts, but it's in its infancy.*

What does the phrase "in its infancy" convey in the sentence?

(A)   a sense that the technology is new and exciting

(B)   a sense that the technology still has a long way to go

(C)   a sense that the technology is capable of improving public safety

(D)   a sense that the technology is very difficult to use

4 Which of the following sentences from the article shows how scientists hope new technology can be used to prevent deaths during an avalanche?

(A)   Information on snow layers can be uploaded to a database to help avalanche forecasters track the presence of weak or slippery sheets buried across a landscape.

(B)   However, while new developments in avalanche-safety tech such as the smart probe and Lidar may pay off in saved lives in the future, they're not all that useful yet, argued Brandon Schwartz, lead avalanche forecaster for the Sierra Avalanche Center, a nonprofit partner of the U.S. Forest Service, which puts out daily slide-hazard bulletins.

(C)   As the Scope is pushed into the snow, the pressure sensor measures hardness and sends the data through an algorithm that translates it into types of snow layers, while the other sensor tracks the depth, to build a virtual picture of the snowpack

(D)   Still, as promising as the new avalanche forecasting technologies may be, traditional tools, including beacons, probes and shovels, and training in skills such as snowpack testing and forecast analysis remain vital to help prevent tragedies, experts say.