

S O L V I N G

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K I L L E R

C I P H E R

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> M D H N 9 K S ⊕ Z O

P-O-R

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J ϕ / ∇ Z N \wedge ∇ R \bullet

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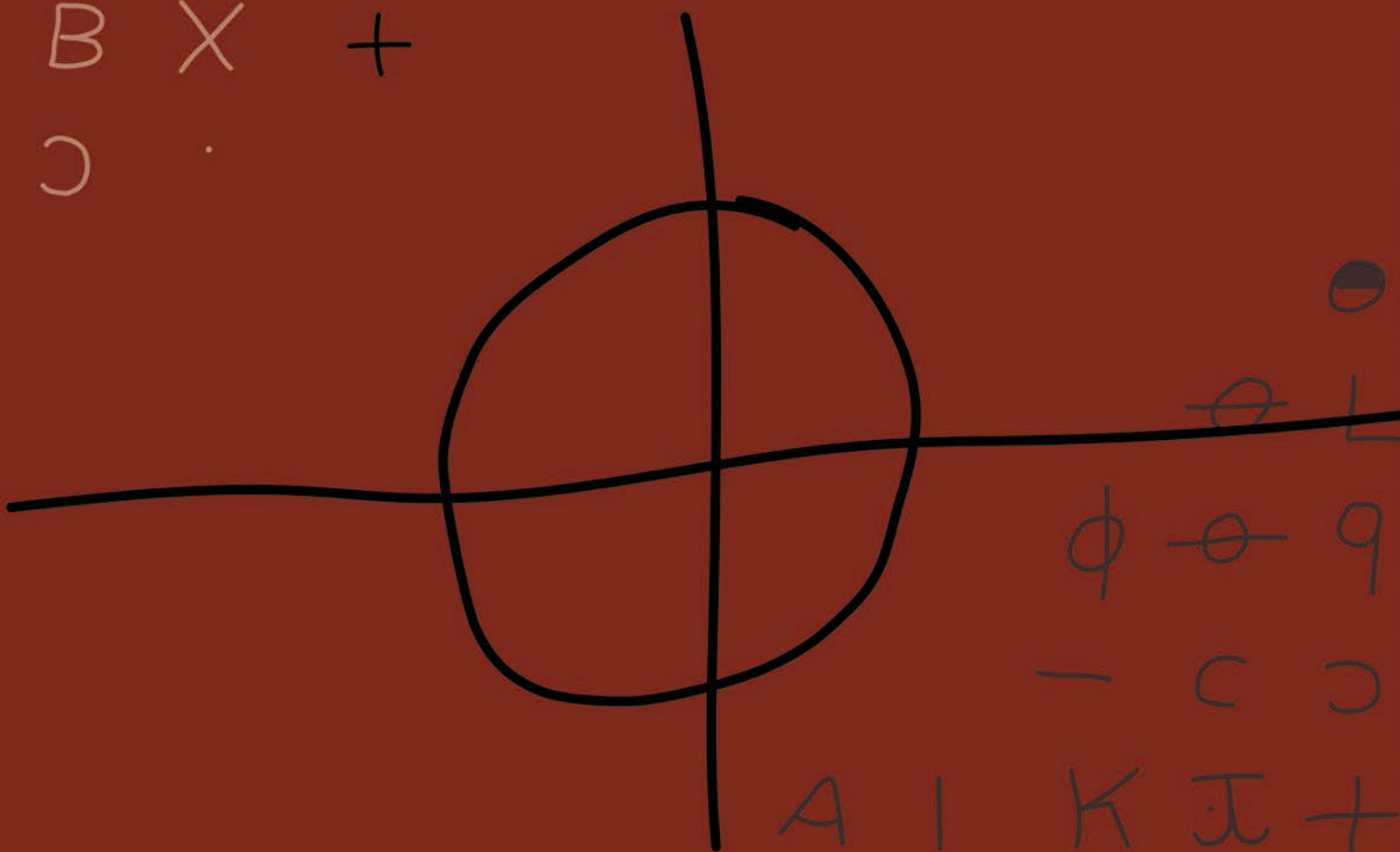
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To aid in solving a decades old cipher to help reveal the infamous Zodiac Killer's identity, University of North Texas computer science and engineering professor, Ryan Garlick, joined a five-member code team in a special series, "The Hunt for the Zodiac Killer," that premiered in November 2017 on the History Channel.

The Zodiac Killer

The Zodiac Killer terrorized northern Calif. in the late 1960's and early 1970's. It has been confirmed that he killed at least five people, but he claimed to have killed up to 37 people in the letters and postcards he sent to local newspapers and law enforcement. The killer would taunt law enforcement and the public in the letters.

In July 1969, the Zodiac Killer sent his first letters to the Vallejo Times-Herald, San Francisco Examiner and the San Francisco Chronicle claiming responsibility for two shootings and providing specific details about the murders. Accompanied by the information, he included a cipher split into three parts for each newspaper and a threat to kill again if the cipher was not published by the newspapers. The cipher was solved within a week by a couple at their breakfast table. The cipher began "I like killing people because it is so much fun" and continued with why he liked killing and described his victims as slaves for his afterlife.

A few months later, the Zodiac Killer sent another 340 character cipher, "Z340," along with a humorous greeting card. Almost five decades later, the 340 character cipher is still challenging experts like Garlick.

Garlick's Expertise

Garlick began his work on solving the Zodiac cipher because he was always interested in solving puzzles and intrigued by the unsolved Zodiac Killer case. Based on his knowledge and experience of the cipher and coding, Garlick was asked to join the code team for the

History Channel series. Garlick, who has had students in his UNT computer science class develop software to try to crack the Z340 cipher, was previously on the 2009 National Geographic documentary "Code Breakers" for his work with the cipher in his class. His paper, "How to know that you haven't solved the Zodiac-340 cipher," is what Garlick believes gained the initial attention from the networks, along with his existing connections to other members of the code team.

In his paper, he discussed the similar patterns of people who believed they have solved the cipher, but likely had not. Using patterns such as a symbol representing multiple letters and anagramming often led to incorrect solutions because these methods allow the possibility of inserting virtually any solution. Garlick thinks they should focus on a consistent pattern.

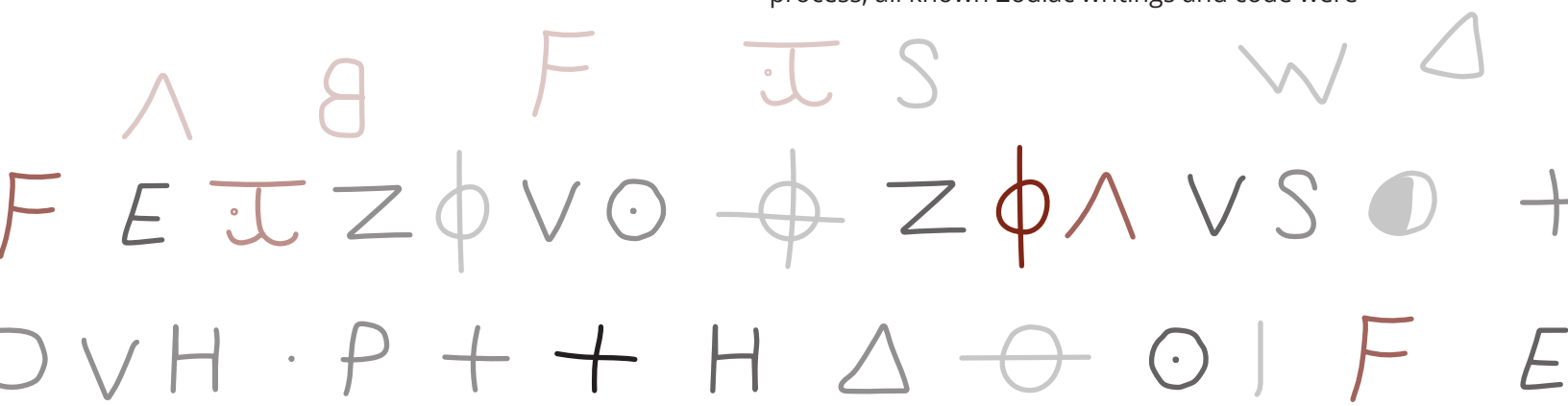
"All of these people thought they solved the cipher, but unknowingly introduced many degrees of freedom in their solution," Garlick said. "They were really opening up so many possibilities that the solution could be any number of things."


The Hunt for the Zodiac Killer

Garlick was joined on the code team by York College math professor Craig Bauer, Google computer engineer Sujith Ravi, Zodiac expert David Oranchak and University of Southern California computer science professor and the code team leader, Kevin Knight. The show also features Knight's high-tech artificial intelligence called Carmel, which is a super computer that can search through trillions of patterns in the cipher and is programmed to think like the killer.

On "The Hunt for the Zodiac Killer," along with the detectives working on the case, Garlick and the code team were evaluating evidence and other previously unrevealed details to make connections and solve the cipher. In an attempt to recreate the killer's thought process, all known Zodiac writings and code were

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plugged into Carmel to look for the language he uses in the cipher. Through the team's software, they could evaluate words and word usage in the evidence database. The software was able to discover common words used and even repeated misspellings, so every detail could aid in revealing the killer's identity.

"The show was unscripted," Garlick said. "They told us a topic; we started talking and they picked out what was interesting."

On the code team, Garlick worked specifically on transpositions of the ciphers. In other words, he looked at the different directions the cipher could be read. Instead of reading left to right and top to bottom, he would look at reading it vertically, in a spiral, or thousands of other possibilities.

Garlick also had two UNT students, TAMS student Julian LaNeve and Ph.D. student Jacob Hochstetler, contributing to the process while on "The Hunt for the Zodiac Killer." Garlick believes working on the Zodiac Killer cipher is a good practical application of algorithms and computer science for students.

"We're not just solving a problem in a textbook," Garlick said. "We have a real problem here that might help solve one of the biggest serial killer cases in history. We can use computers to write software to help us with that."

The biggest challenge for Garlick is how many different possibilities of how the cipher could be read. From the direction the cipher is read to what each character represents to any other minor or major detail, every possibility has to be tried. There is a chance the cipher is in a language other than English. Some theories even say the cipher could be entirely gibberish. However, Garlick doesn't think it is because of linguistic statistics and corrections made by the killer in his ciphers.

"It hasn't been solved in 50 years and the Zodiac liked to taunt the public and police so what better way to do it than to send something that you knew they would work on forever," Garlick said. "But there are some things that indicate that it is not gibberish. Some of the statistics of the cipher itself, once transposed - it doesn't look like random symbols."

Join the Hunt

For those who want to contribute to solving the case and cipher, Garlick's advice is to "keep at it." He believes the internet community working on the case have contributed to it greatly. He says that more people working on the case results in more diverse viewpoints and ideas being contributed to the case.

"There is a really great community of people working on it that have uncovered amazing things," Garlick said. "They've uncovered comic books that he clearly referenced in his communications to the police. Just knowing that he had this comic book gives us a year range; we might find a subscription list for that comic book."

Garlick encourages anyone interested in the Zodiac Killer case and coding to watch "The Hunt for the Zodiac Killer" on the History Channel and join the online communities. He recommends looking at message boards to learn more about the case and going to the website, zodiackillerciphers.com, to use the tools David Oranchak has created for exploring and experimenting with statistics and patterns of the cipher text.

"The number of people the internet can bring to work on this is incredible and very helpful," Garlick said. "The more people we have in the community to look at it, the greater the chance someone is going to come up with something."