A few days before the presidential election in France this year, documents purported to contain unverified information that was damaging to Emmanuel Macron's campaign were leaked online, just before a nationwide moratorium on media election coverage began.

The discussion tagged "MacronLeaks" was tweeted nearly 350,000 times on social media. Nonetheless, Macron won the French presidency by a wide margin over Marie Le Pen. The disinformation campaign appeared to have limited effect on French voters. Why?

Emilio Ferrara, a research leader and principal investigator in the Machine Intelligence and Data Science (MINDS) group at the University of Southern California's Information Sciences Institute, has found the likely explanation: the disinformation campaign itself was mostly shared by foreigners outside of France.

For his study, "Disinformation and Social Bot Operations in the Run Up to the 2017 French Presidential Election" posted online and slated to be published in First Monday next month, Ferrara looked at the timeline of the election and leveraged his previous experience in studying Twitter bots during elections to identify anomalies, patterns and profiles of those who shared and consumed, and revived links to content that was intended to undermine the Macron campaign in favor of Le Pen.

Ferrara, an expert in distinguishing bots from humans on social media and a research assistant professor at the Department of Computer Science at USC, studied a dataset of almost 17 million tweets from an estimated 2 million users this year from April 27 through May 7, France's election day. Through a combination of machine learning and other modeling techniques, Ferrara discerned bots from humans with over 80 percent accuracy based on the characteristics of the Twitter accounts, including the frequency of account postings and the customization of the account profile. Ferrara then developed a profile of those who engaged in sharing the leaked and possibly false information about the Macron campaign.

Ferrara determined that 18 percent of the MacronLeaks promoters were bots, compared to 15 percent of bots that were deployed in the U.S. presidential campaign.

Ferrara said that the users sharing and promoting "#MacronLeaks" and the affiliated files were mostly foreigners who, Ferrara noted, favored "alt-right" topics. MacronLeaks, he added, was tweeted about more than half the time in English 177,695 tweets out of 350,000) than in French (less than 40 percent, or 135,397 tweets).

Ferrara hypothesizes the existence of an underground market of reusable political disinformation bots.