equired Discussion 23.2: Current Applications of Gen AI [60:00] - Section C

For this discussion, select one from the following industries: healthcare, finance, or education. Then, complete the following:

1. Research how your chosen industry is integrating APIs with generative technologies (e.g., GANs, diffusion models, transformers) in their operations or products.
2. Look for case studies, news articles, or reports that highlight practical applications of these technologies.
3. Share a discussion post that includes the following:
   * Your chosen industry
   * The specific generative technology or API used
   * How the technology is being applied and its impact

 I chose **finance industry.**

 In finance, researchers and companies use GANs, diffusion models or transformer.

**GANs in finance**: companies and researchers use GANs for:

* Market prediction
* Portfolio optimization
* Risk management
* Fraud detection
* Automation and processing

**Transformer in finance**: companies and researchers use transformer for:

* Risk assessment
* Credit scoring
* Sentiment analysis, with BERT
* Market price forecast

**Diffusion in finance**: companies and researchers use transformer for:

* Risk analysis
* Asset pricing
* Liquidity analysis
* Volatility of portfolio
* Market price prediction

**Articles in finance, using GANs, Transformer and Diffusion algorithms:**

Gen AI algorithms have been used by researchers to study stock price, as an issue I want to give examples.

Zhang and Mariano ( 2024), in their paper, “Integration of Emotional Factors with GAN Algorithm in Stock Price Prediction Method Research”, use TK-GAN model, based on generative adversarial networks, incorporates sentiment factors, the Soft Attention mechanism, BERT pre-trained models, and the AdamK optimizer for stock price prediction. They find their model has better performance in comparison LSTM and CNN.

In another research, Sonkiya et al (2021), in their paper, “Stock price prediction using BERT and GAN”, compare S-GAN, GAN, GRU, LSTM and ARIMA and find that S-GAN has better prediction than ARIMA, GRU and LSTM. Moreover, they use sentimental analysis and find that it affects the market situation by numerically calculating the emotions and sentiment of the investors.

Xie et al (2024), in their paper, “Deep Convolutional Transformer Network for Stock Movement Prediction”, using data from NASDAQ, Hang Seng Index (HSI), and Shanghai Stock Exchange Composite (SSEC), compare the performance of Deep Convolutional Transformer (DCT) with LSTM, Transformer, SA-LSTM and some other methods and find that DCT and Transformer have better prediction and have lower MSE and RMSE.

Mec et al (2024), using Generative Adversarial Network (GAN), study stock market in Germany. They find that Wasserstein Generative Adversarial Network (WGAN) has better performance than LSTM and ARIMA in predicting stock price in case study of Germany.

**Big companies and Gen AI:**

financial companies such as **Bloomberg** are actively leveraging generative technologies like GANs, transformers, and diffusion models to enhance financial services and analytics. With **BloombergGPT**, it uses transformer algorithms to process vast quantities of financial data, including news articles, earnings calls, and research reports, extracting insights to support trading decisions, portfolio management, and risk assessment. Moreover, GANs are used to generate synthetic financial data, which help to train models under various market conditions. financial companies use diffusion algorithms to simulate asset price dynamics and volatility, especially for derivatives.

**Conclusion:**

To sum up, using Gen AI methods, including GANs, Transformer and diffusion are affecting finance industry. Big companies such as Bloomberg use GAN, Transformer and diffusion algorithms to have better prediction of financial markets. On the other hand, researchers and scholars in economics and finance have started to use Gen AI algorithms in finance industry. However, this approach in completely new, but it is compacting finance very soon and deeply.

Mec, M., Zeman, M. and Cermakova, K., 2024. Stock market prediction using Generative Adversarial Network (GAN)–Study case Germany stock market. *International Journal of Economic Sciences*, *13*(2), pp.87-103.

Zhang, R. and Mariano, V.Y., 2024. Integration of Emotional Factors with GAN Algorithm in Stock Price Prediction Method Research. *IEEE Access*.

Sonkiya, P., Bajpai, V. and Bansal, A., 2021. Stock price prediction using BERT and GAN. *arXiv preprint arXiv:2107.09055*.

Xie, L., Chen, Z. and Yu, S., 2024. Deep Convolutional Transformer Network for Stock Movement Prediction. *Electronics*, *13*(21), p.4225.