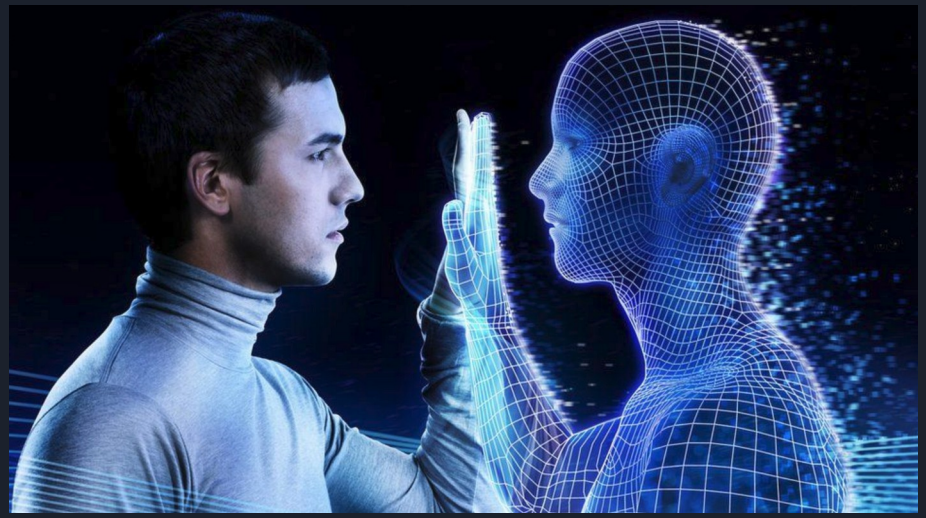
# PharmaPros



Team Members: Taha Abdullah, Triyaksh Mathur,Tanvi Dhamdhere, Michael Rizzo, Omnya Mohamed Izzeldin, Daniel

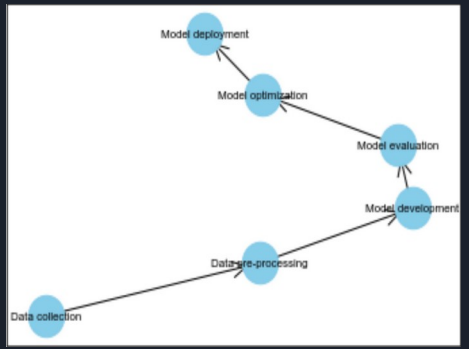
# Problem statement

- Use of animal models
  - Time-consuming
  - Expensive
  - Inaccurate
  - Raises Ethical Concerns
- Nine out of ten drug trials that work with animals fail in human clinical trials
- We will focus on Alzheimer's Disease

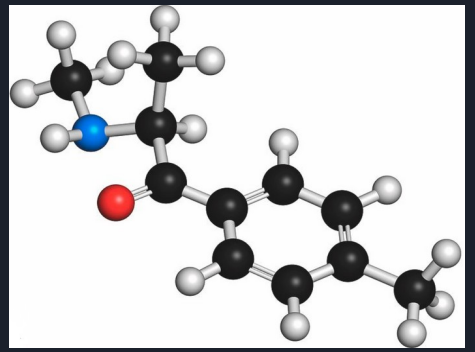
Animal trials

Human trials

Method

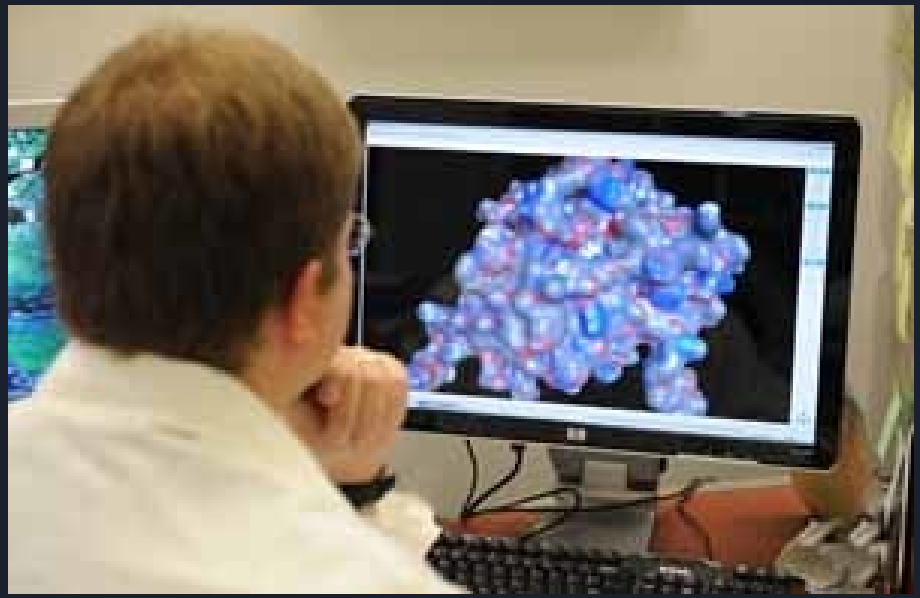



Expected Outcome



# Goal:

- Improved drug discovery process
- Incorporation of in-silico  modelling for target identification
- Validation to enhance drug efficacy and accuracy

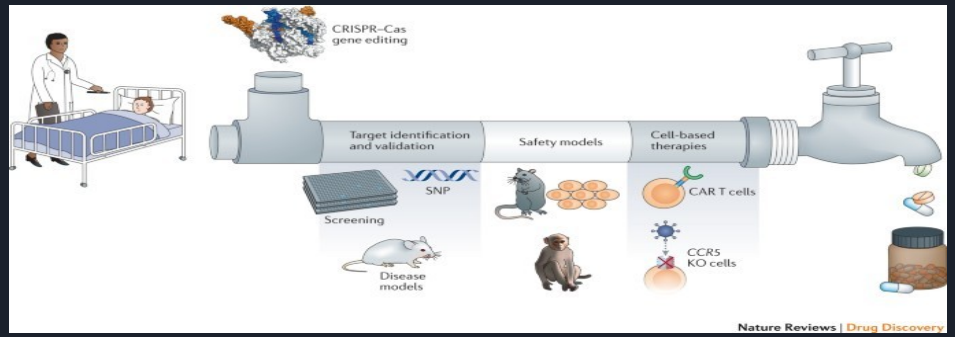


# The Need for In Silico Models in Alzheimer's Disease Research

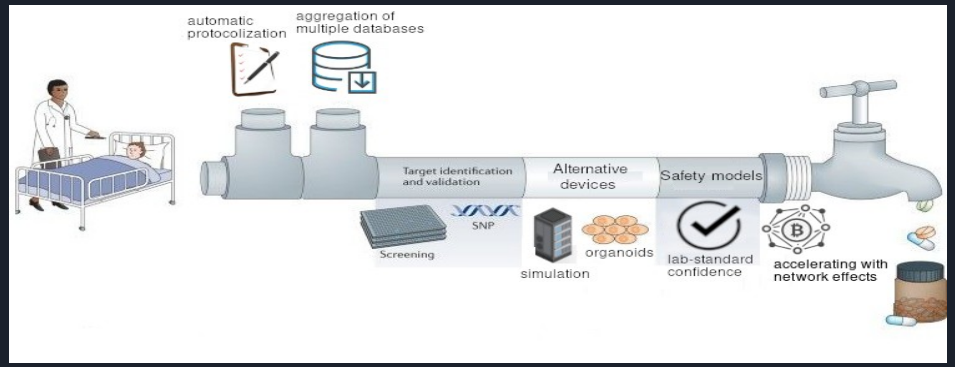
| | |
|---|---|
| People affected by Alzheimer’s worldwide (millions) | 50 |
| Costs of Alzheimer’s (trillions) | 1.1 |
| Failure rate of clinical trials (%) | 99.6 |

Call to action: Invest in in-silico models to improve the chances of developing effective drugs for Alzheimer's disease

# The Solution

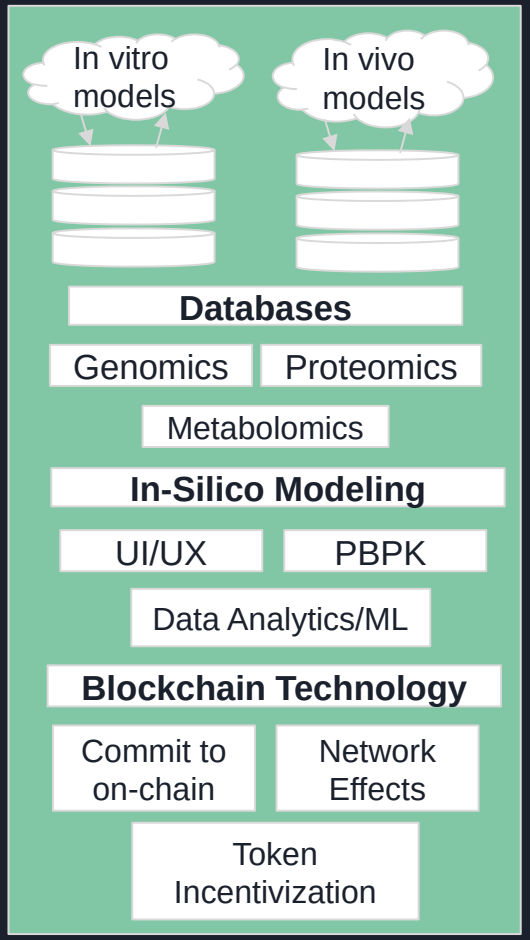



Existing Approach

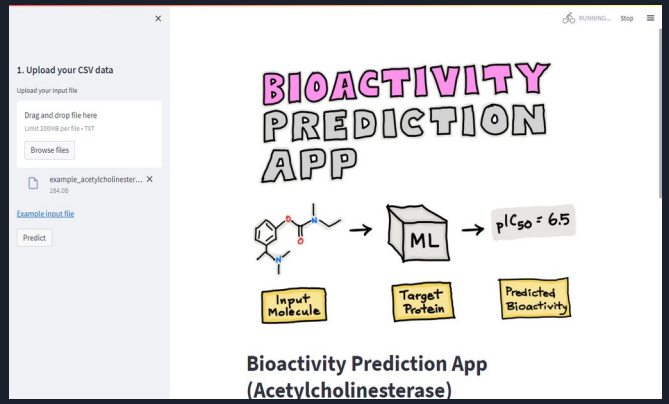


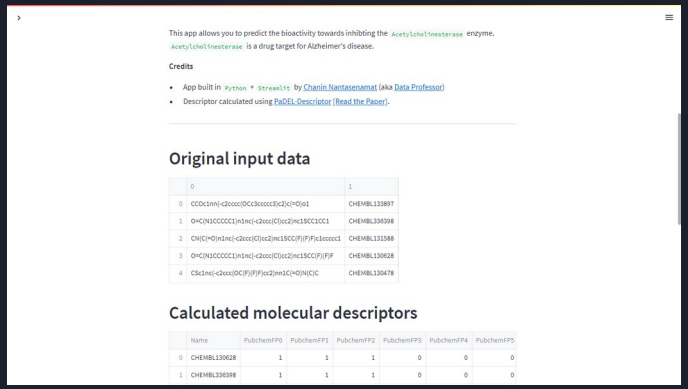

Our approach

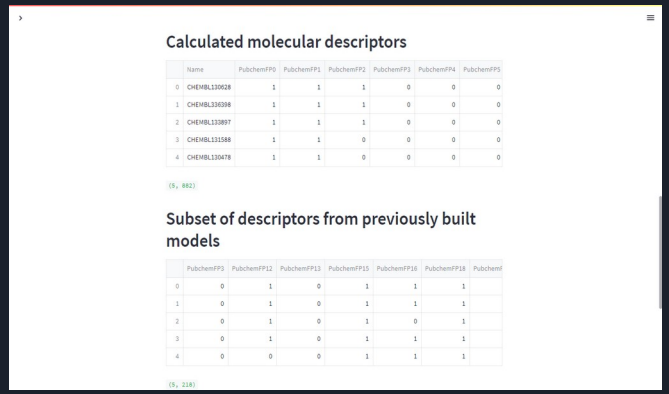
Building a Computational Model MVP

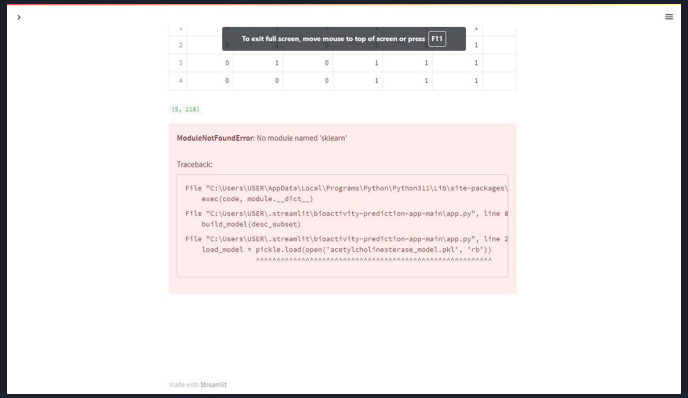


# Application Snippets:



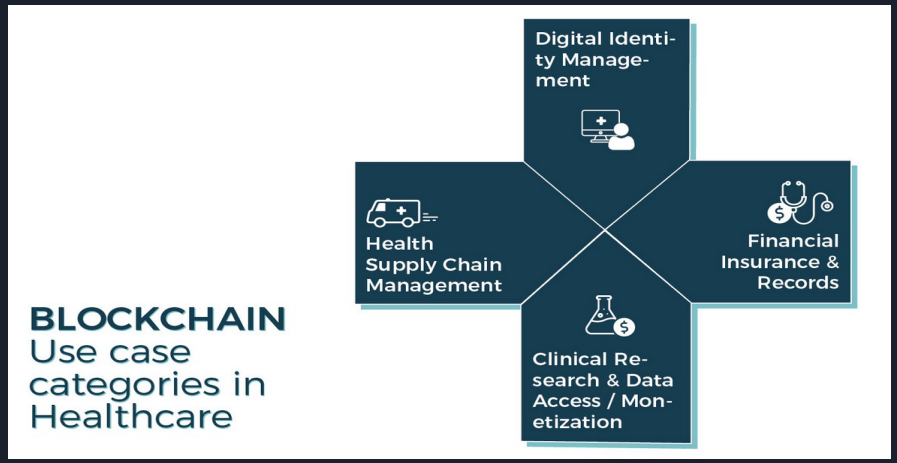



# Underlying Technology

Techniques, Tools and Infrastructure

- A platform for building and running in-silico models
  - PBPK Modeling
  - Integrated with Molecular dynamics suites
  - Machine learning and statistical analysis
  - Visualization software and web-based interfaces
- Data integration and management tools for Big Data
  - API's, cloud-based solutions, etc
  - HPC Clusters
- Blockchain-based Integrations
  - On-chain metadata, smart contracts, decentralized storage
- IT Support for building, deploying and maintaining



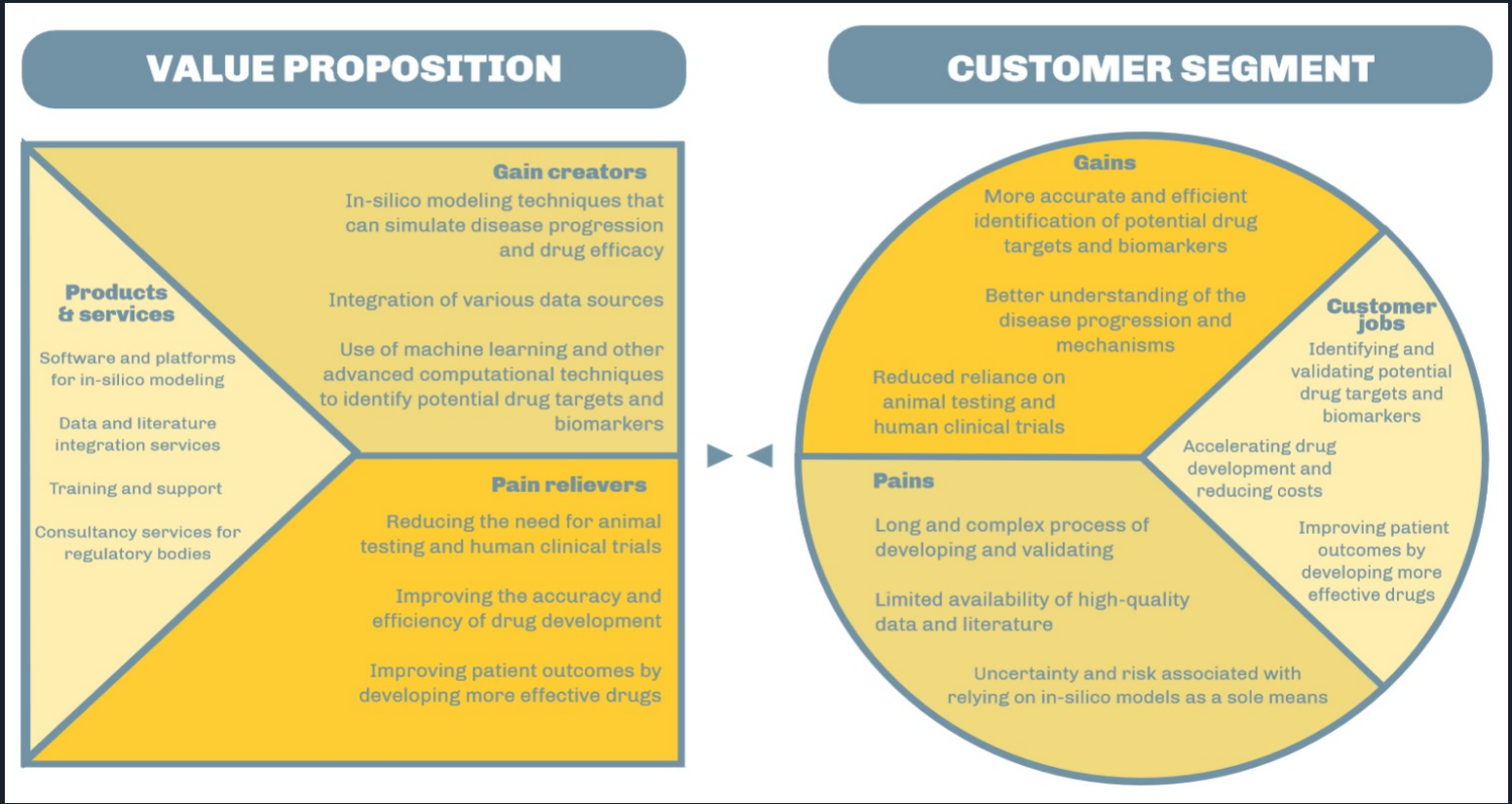

Web3 technologies, such as blockchain, can be used in healthcare to improve

- Data Storage

In our case we intend to

- Generate a confidence factor
- Improve credibility by putting metadata on-chain for verification

# Value proposition and Longevity Challenge



**We aim at improving transferability of research results from animal to human trials and eventually replace parts of animal trials with in silico models.**

**Our current aim is to present a PoC around detecting toxicity of drugs for humans that are developed using animal trials (e.g. Alzheimer's).**

**Incorporated as a part of our aim is recent research that focuses a lot on not only longevity, but also "Healthy Longevity", which includes knowing about long-time toxicity of a drug but also patient conditions and life-quality.**

# Audience and IP Strategy

IP Strategy:

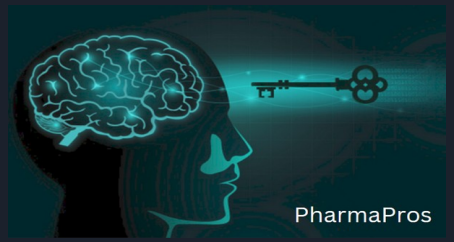
- Patents for simulation algorithms and data integration methods
- Open-source data storage and blockchain integration
- Exclusive licensing agreements for certain technology and simulation methods with clear terms for sharing and collaboration
  - Dual-licensing model
  - Commercial vs Open-source licensing
- Option for individual patients to own and control their own data

Target Audience:

- Pharmaceutical companies
- Biotechnology companies
- Medical Device Manufacturers
- Research Institutions

# Competition

Our Niche:




- Stronger emphasis on integrating data from various sources
- Incorporating blockchain technology to secure data and improve traceability and verifiability of results
- Providing a digital twin for improved visualization and intuition in drug discovery and real-time information for more up-to-date insights
- Combining in silico modeling with in vivo testing to provide a more comprehensive approach to drug discovery

The Landscape

Artificial Intelligence and Machine Learning for Drug Discovery:

Insilico Medicine

Exscientia

UNLEARN

Pharmacokinetic and Pharmacodynamic Modeling:

G+

PK-Sim

CERTARA

Computational Tools for Drug Discovery:

Schrödinger

Leadscope

Atomwise

S+

Genedata
solutions in silico

optibrium

# Validation and Feasibility


Validation:

- We will need to test and validate the simulation and data integration methods
  - Leverage partnerships
- Compare simulation results to in vivo and in vitro experimental data


Feasibility:

- Proof-of-concept studies with industry partners
  - Demonstrate utility
  - Examine cost-effectiveness
- Scalability analysis to ensure the platform can handle large amounts of data and multiple simultaneous users

# Novelty

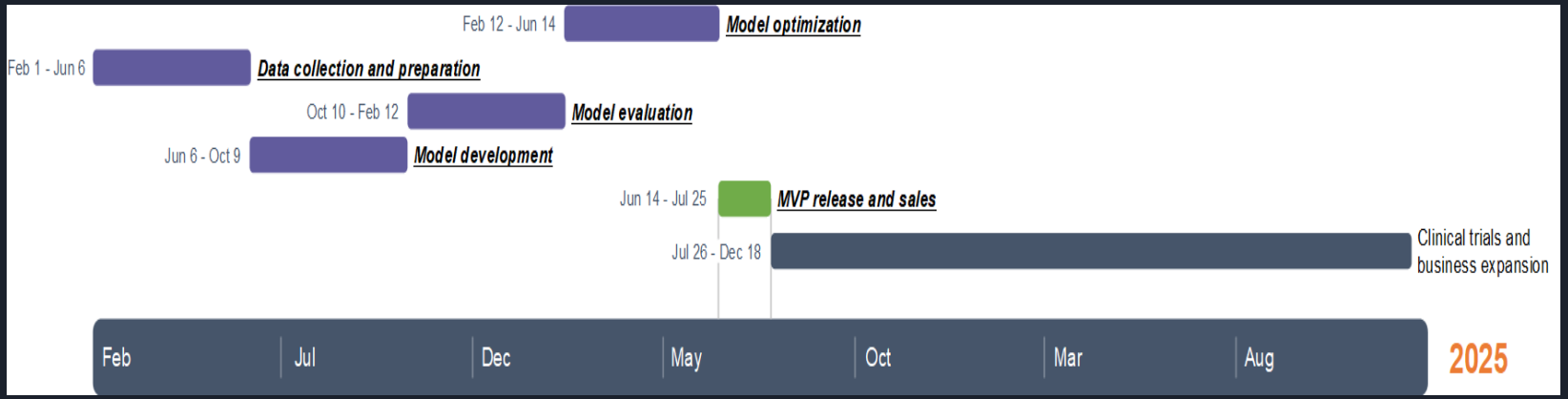
- Increasing the traction of alternative drug-discovery methods
  - Reduce need for specific types of animal trials out of the box
- Use of advanced modeling techniques
- Integration with other in silico platforms
- Personalized predictions on how to modernise your workflow
- Examine a much broader range of “What-if” scenarios
- Interoperability with existing scientific tools

# Timeline and Revenue Model

Gantt Chart for Development Timeline

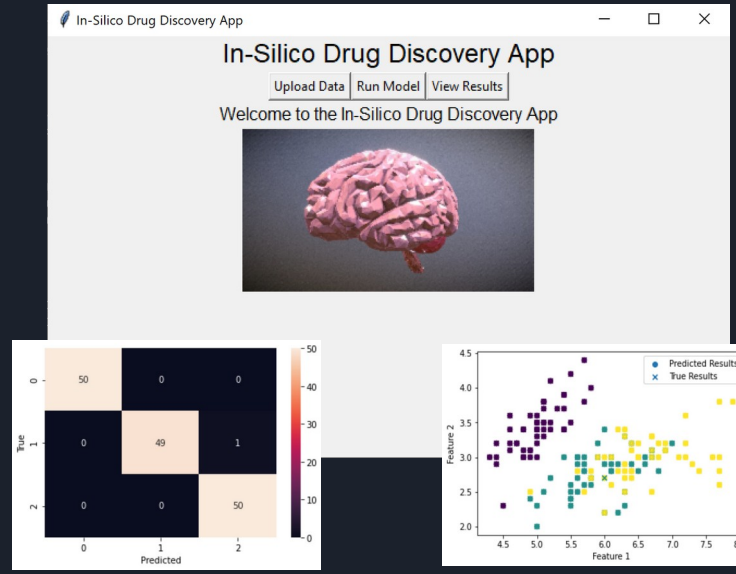
Ways we could make money at onset

- Subscription-based model
  - Charging a medium fee to use our plugin for a popular software suite
  - One time fees for utilization  of tool
- Consulting services
  - Fee for helping customers use the tool better
  - Fee for insights generated by our experts



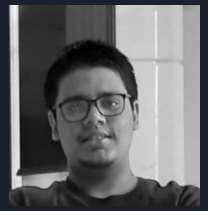
# Conclusion

- Develop an accurate and reliable method for predicting drug efficacy and toxicity in Alzheimer's disease
  (reduces the reliance on animal models)
- Blockchain technology to improve confidentiality and open access
- Plan to continue to test and validate our MVP, seek funding and partnerships
  - Develop a plugin and web interface




PharmaPros: *Unlocking the secrets of Alzheimer's one in-silico model at a time*

# PharmaPros Team



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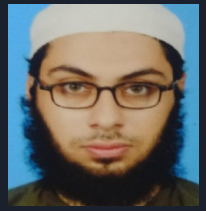
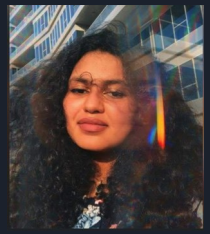


Taha Abdullah
Android & IoT

Michael Rizzo
Engineer (ECE)



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