

SMART INDIA HACKATHON 2025

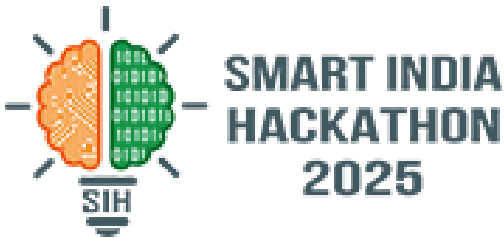


- **ID :** 25131
- **Title :** Student Innovation
- **Theme :** MedTech / BioTech / HealthTech
- **Category :** Software
- **Team ID :** 63659
- **Team Name :** Rakshanu
- **Demo Video Link :** <https://tinyurl.com/bdhhfft6>
- **Prototype Link :** <https://viroai2.netlify.app>

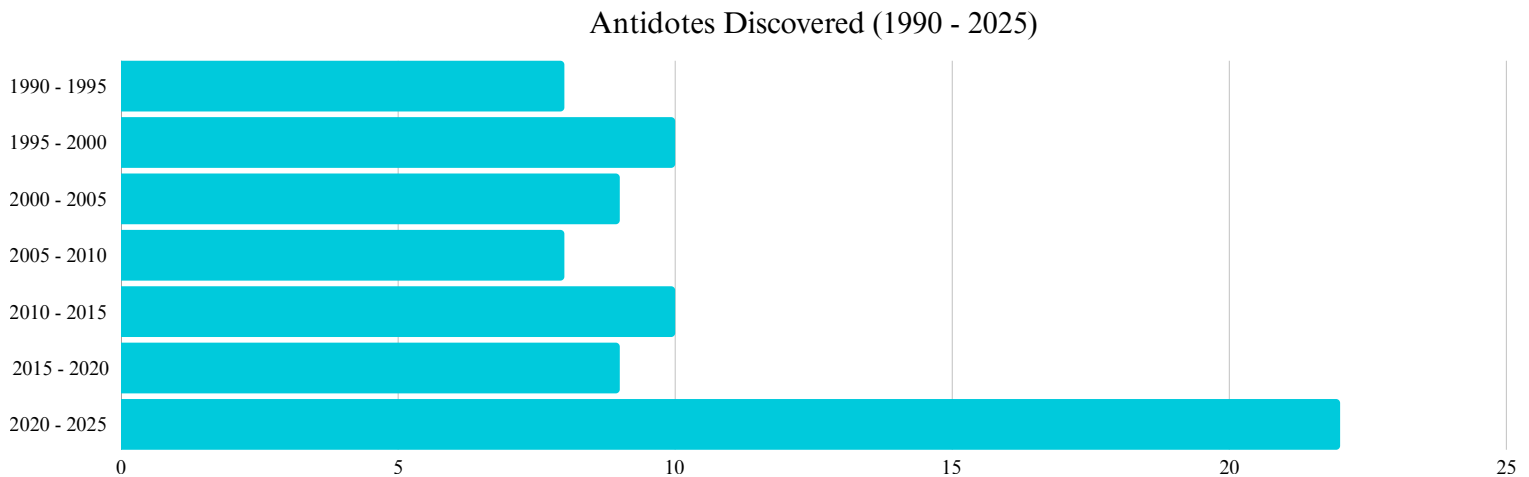
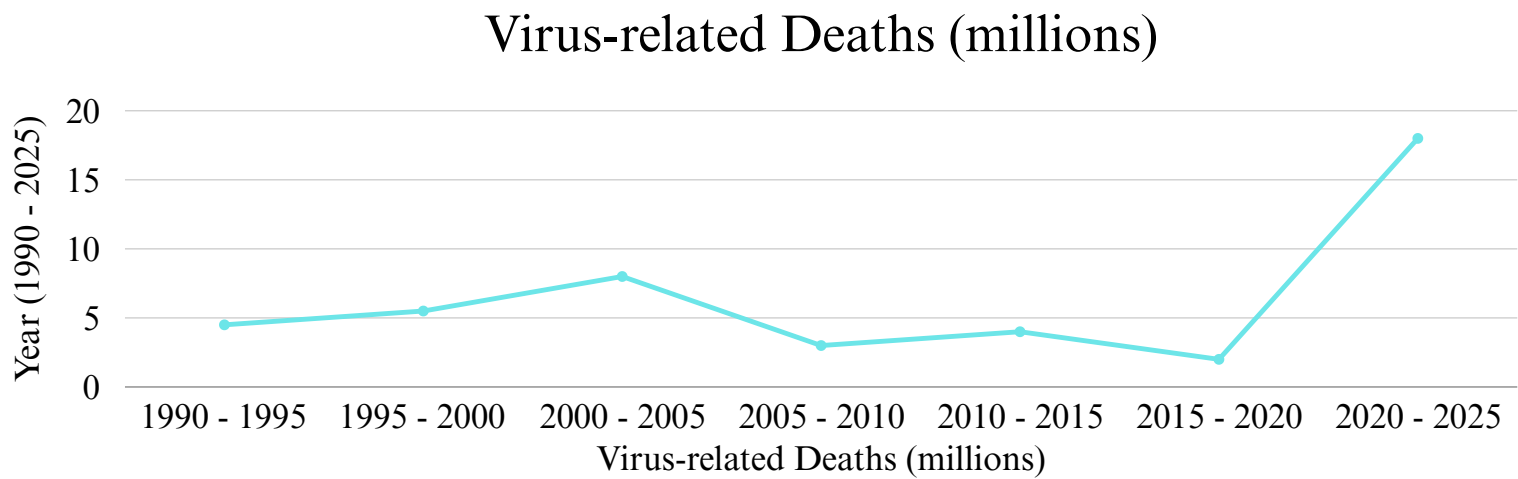
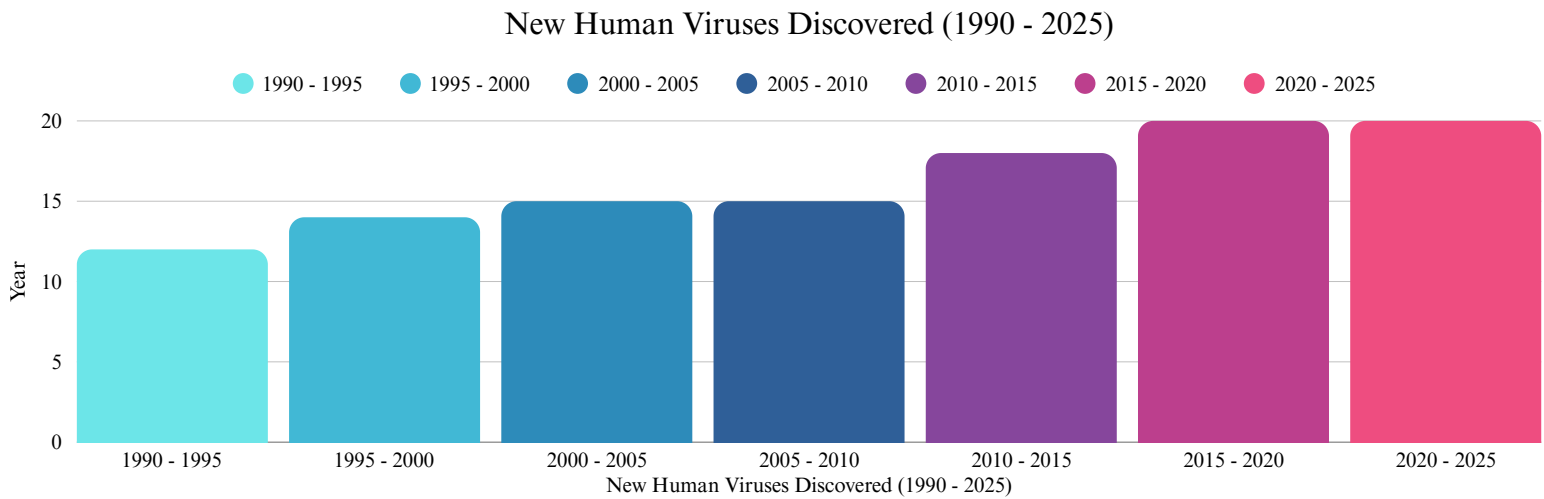
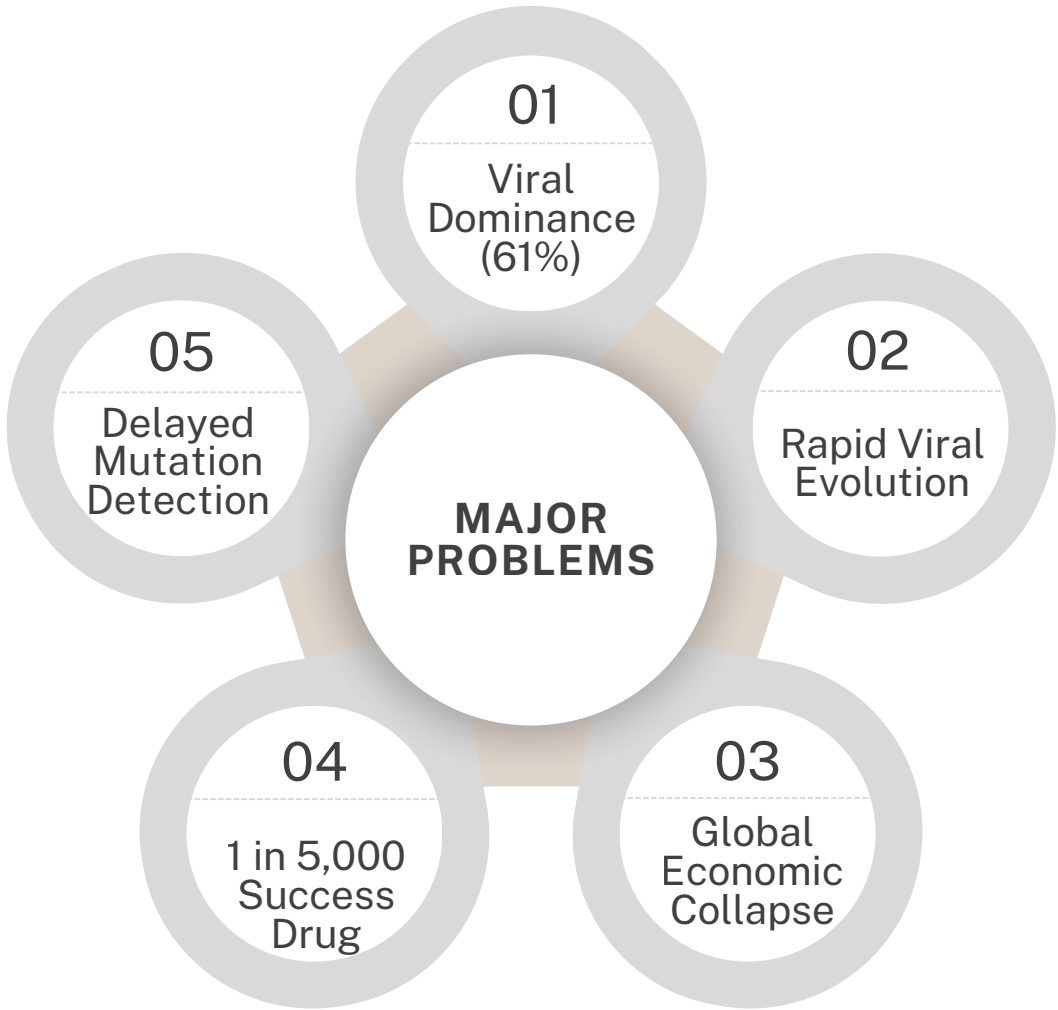




PROBLEM STATEMENT



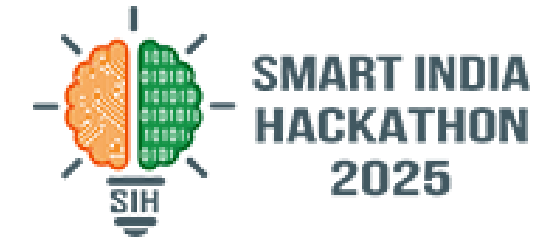
Rising healthcare needs and growing populations drive demand for innovative biotechnologies in viral prediction and drug discovery.



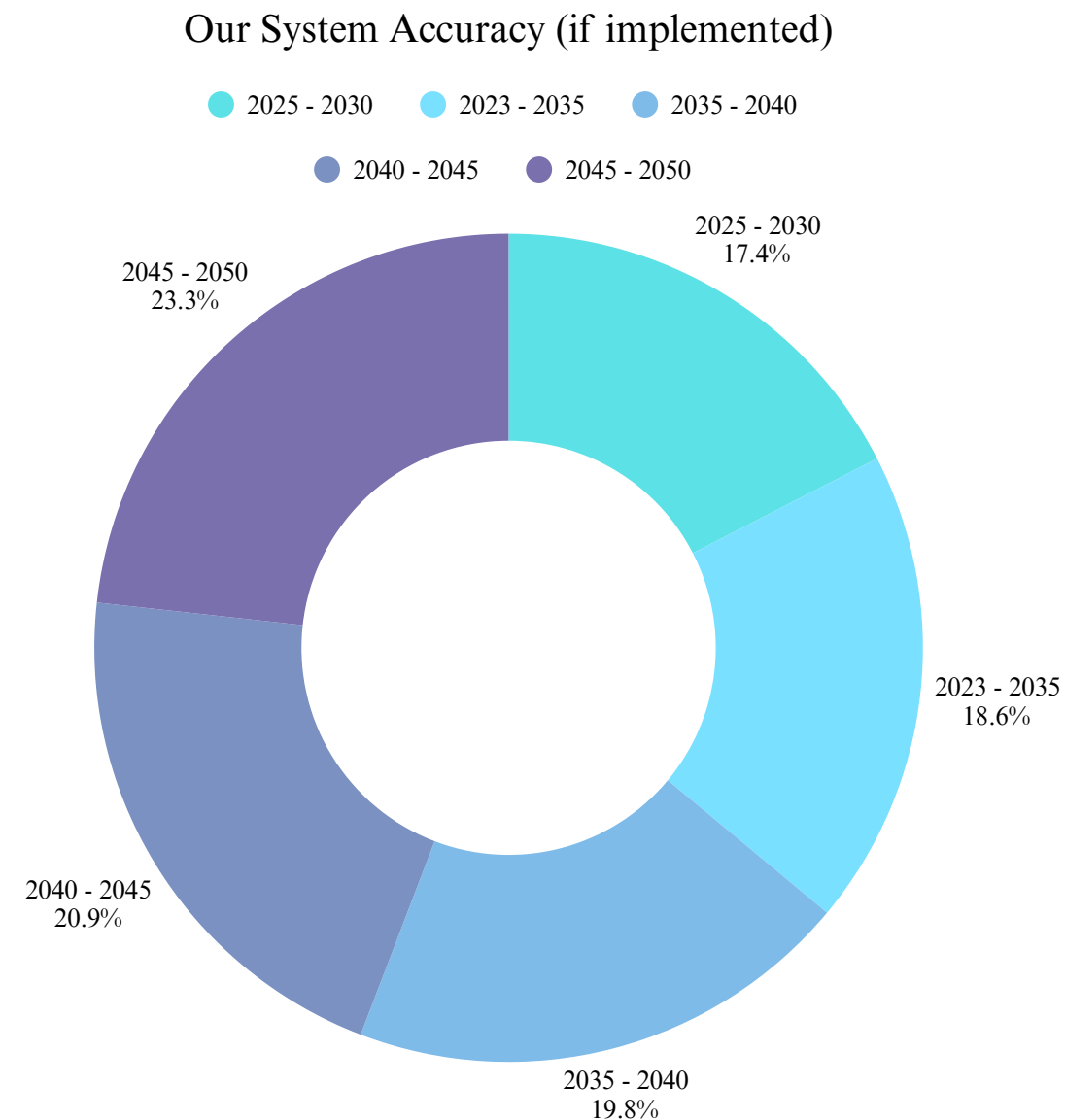
The Black Death wiped out nearly one-third of Europe's population — 25 to 50 million lives lost in just 7 years.”



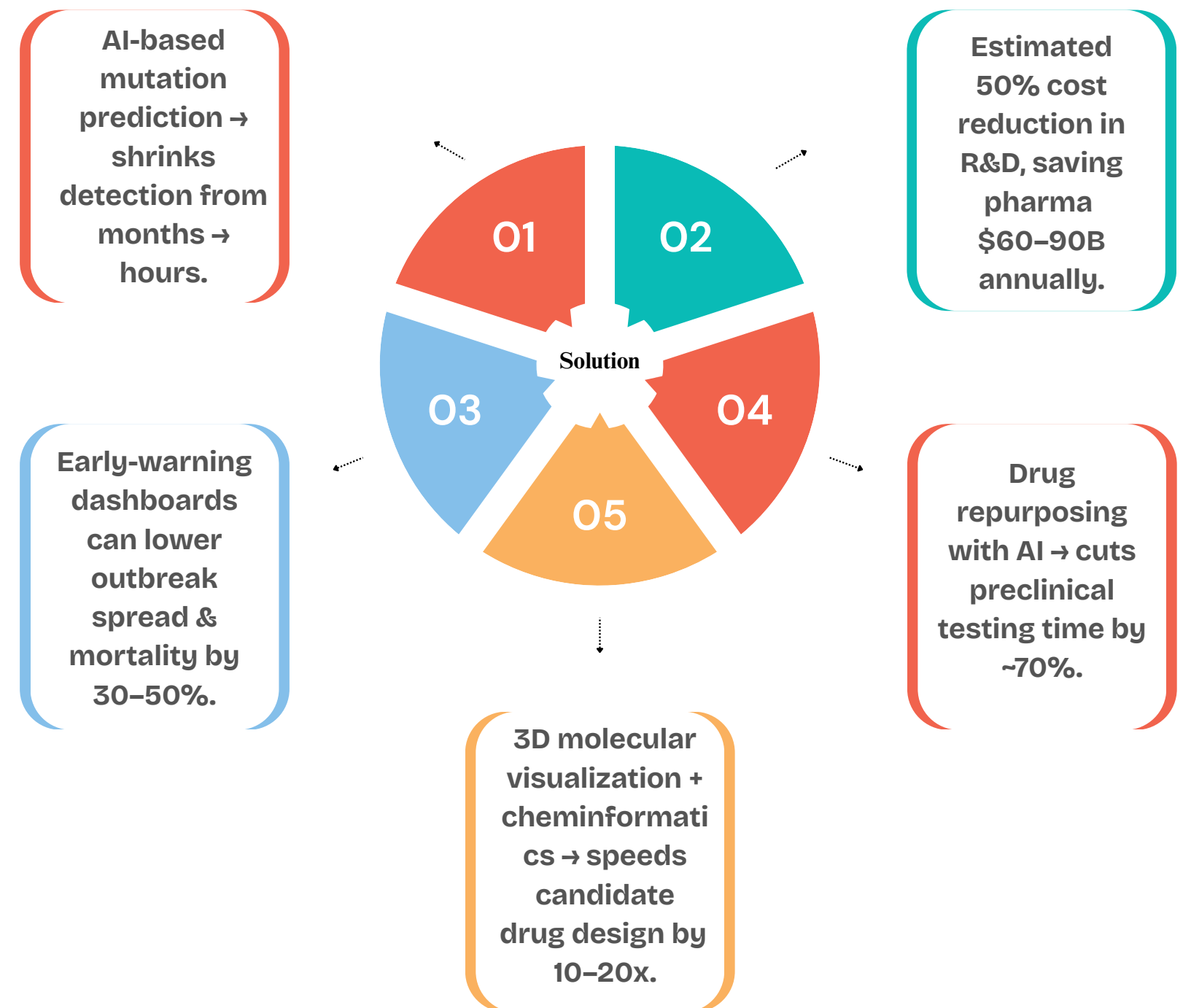
SOLUTION



Viro-AI: An AI-driven bioinformatics platform that forecasts viral mutations, simulates protein structures, and identifies potent drug candidates to accelerate outbreak response and therapeutic discovery.

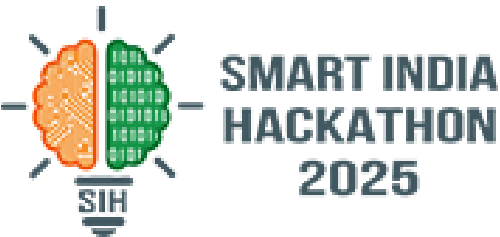


Viral Insight & Rapid Optimization Analytics Intelligence

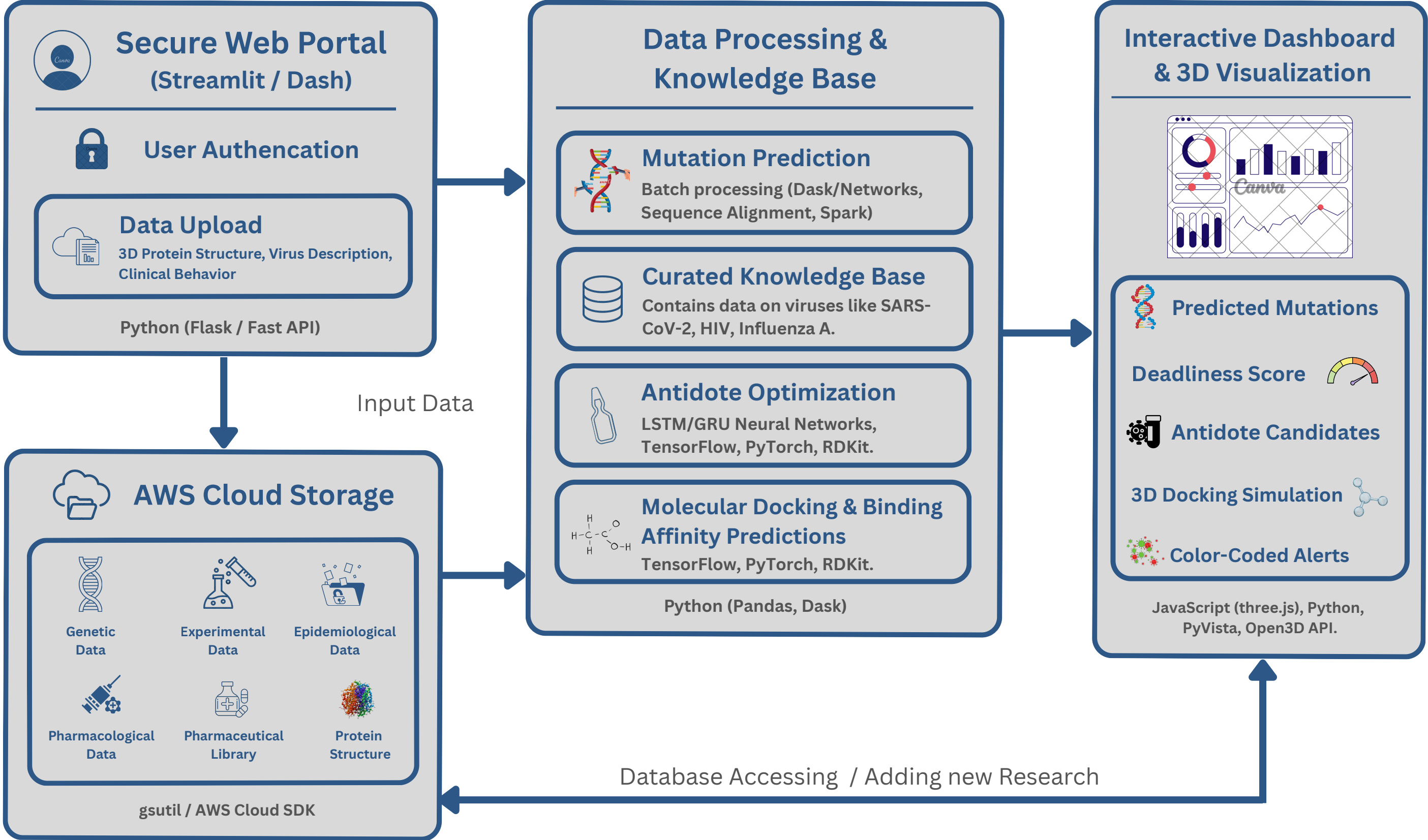




TECHNICAL APPROACH

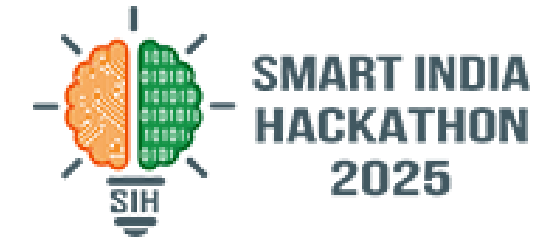


SYSTEM ARCHITECTURE





FEASIBILITY & VIABILITY



The Synergy of Strengths, Readiness, and Strategies

Prepared Advantage

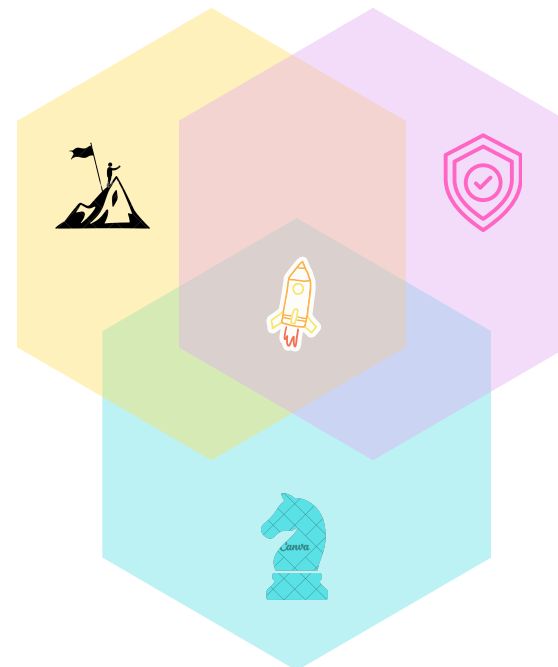
- Accelerated Discovery
- Proactive Response
- Decision Support

Strengths

- End-to-End System Integration
- Proactive Threat Assessment
- Interactive 3D Simulation

Strategic Advantage

- Phased Go-to-Market Strategy
- Multi-Modal Data Integration
- Explainable AI (XAI) for Trust



Readiness

- Scalable Architecture Challenge
- Mitigation Clear Roadmap

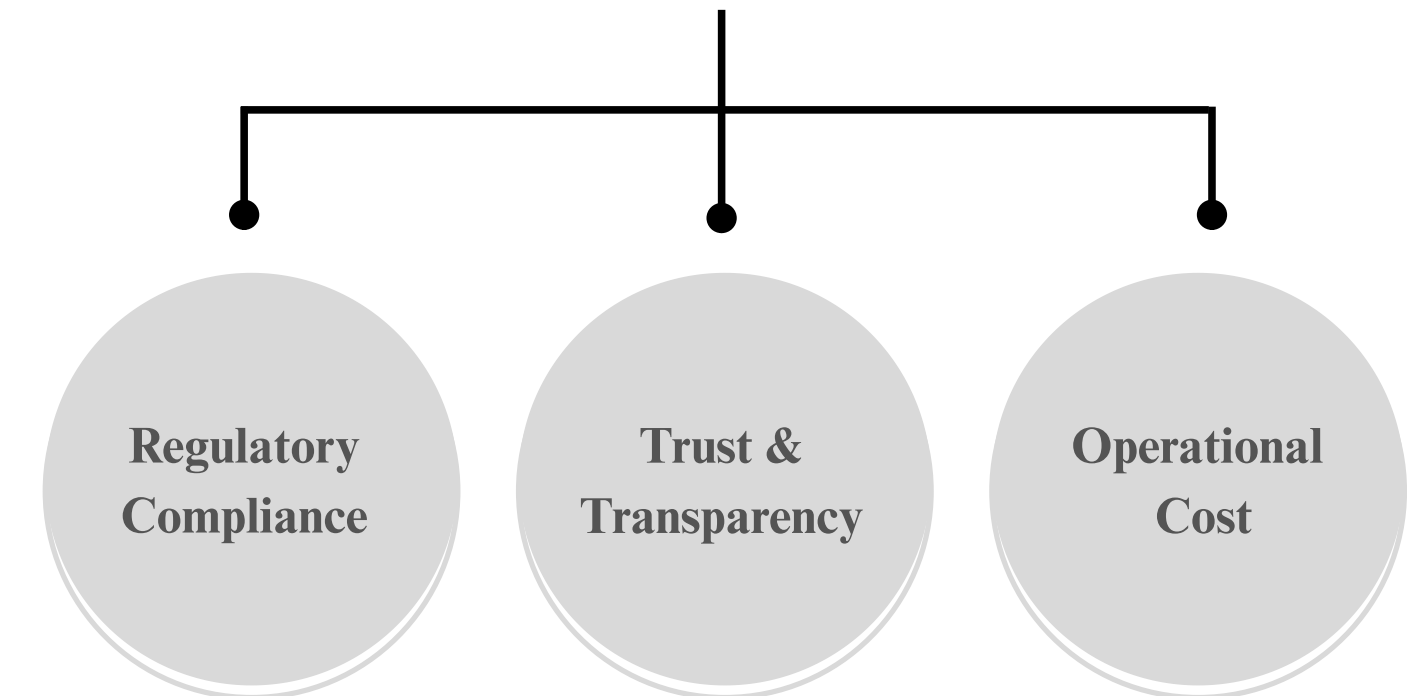
Proactive Planning

- Phased Development Roadmap
- Systematic Data Sourcing
- Anticipatory Risk Mitigation

Strategies

- Automated Data Acquisition
- Explainable AI (XAI)
- Transparency Phased Commercialization

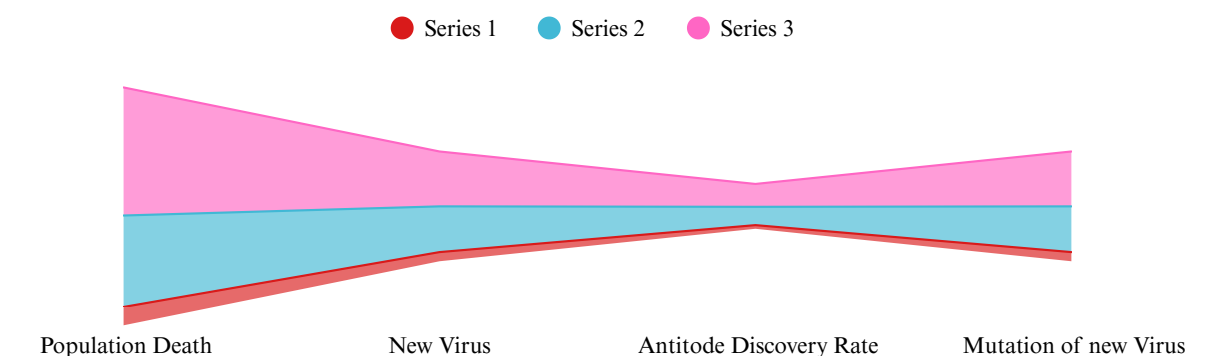
Potential Challenges



Global health data governed by GDPR, HIPA; non-compliance risks fines up to \$20M or 4% revenue.

Lack of transparent reasoning limits clinical validation; 70% of biomedical AI tools fail, to advance beyond pilot studies

Training large biological models (e.g., AlphaFold) requires >200 GPUs, costing \$1-2M annually if unmanaged



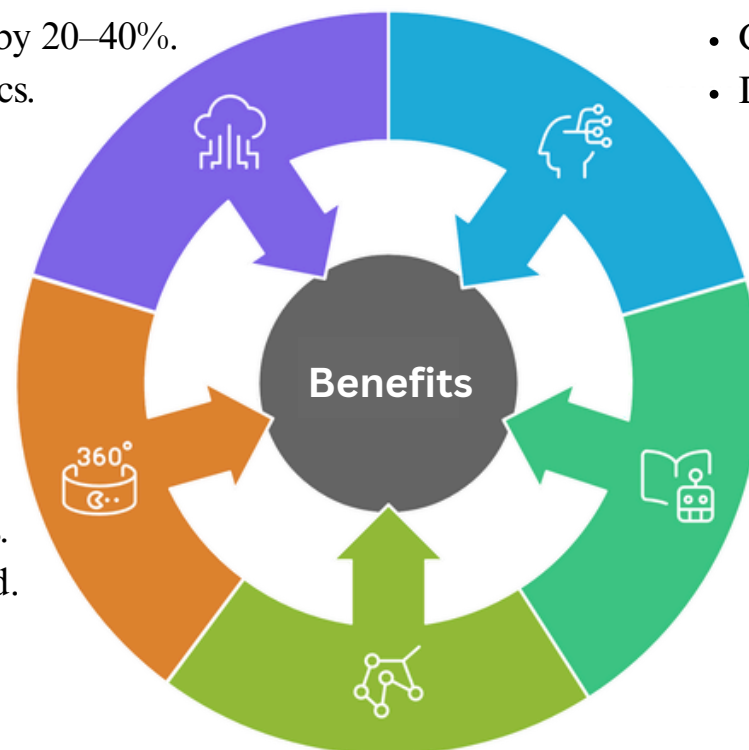
Benefits of VIRO - AI System

Social

- Early detection cuts fatality rates by 20–40%.
- Saves millions of lives in pandemics.

Healthcare

- 3D molecular visuals for clinicians.
- Cuts 80% bioinformatics workload.



Environmental

- Less animal testing with simulations.
- Tracks zoonotic diseases.
- Lower R&D carbon footprint.

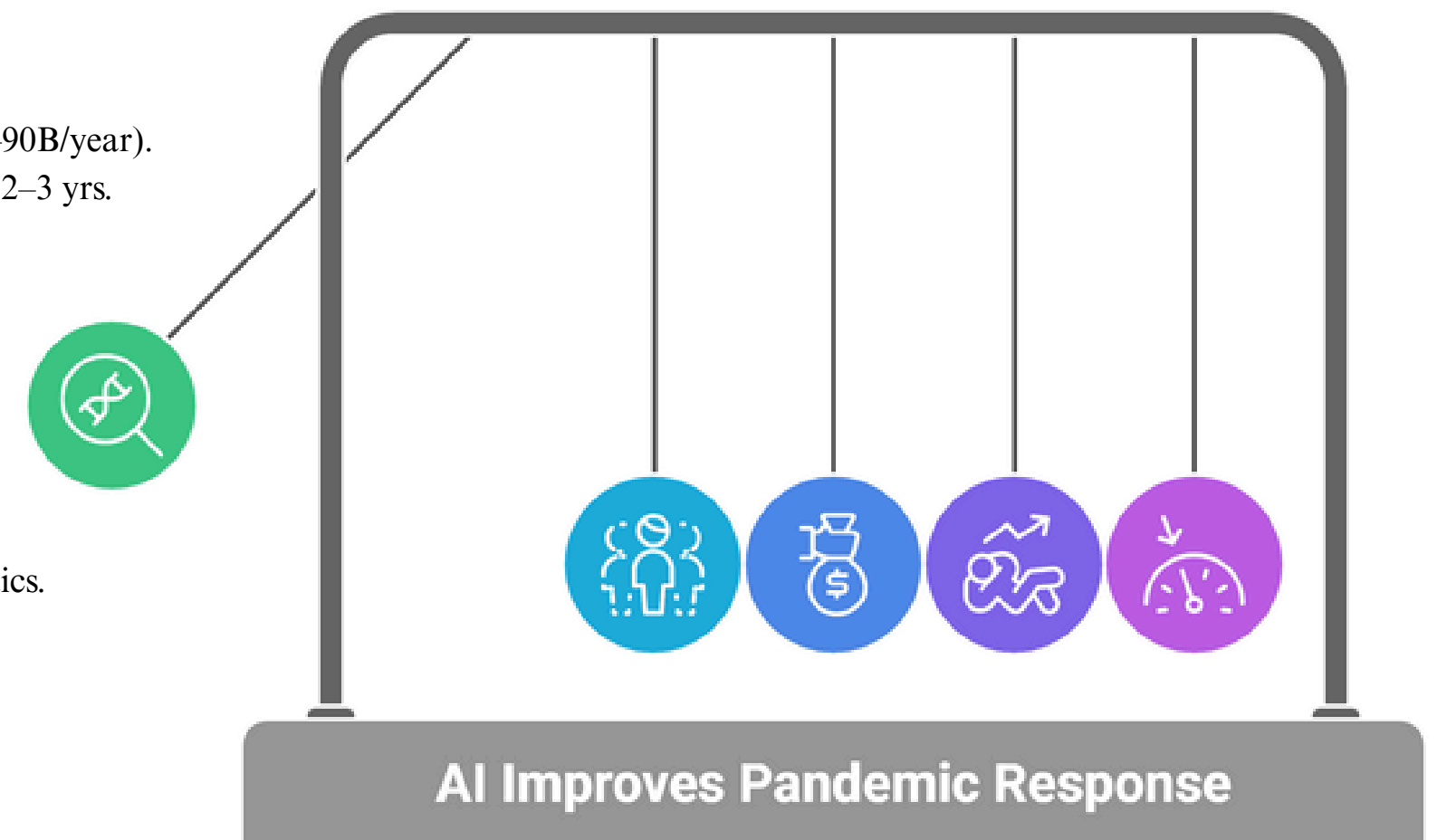
Economic

- Cuts R&D costs by 30–50% (saves \$60–90B/year).
- Drug discovery time reduced: 12 yrs → 2–3 yrs.

Technological

- Unified AI + ML + Cheminformatics.
- Cloud-native,
- 99.9% uptime global monitoring.

Impact of Pandemic Preparedness



Reduced Transmission
Up to 60% reduction

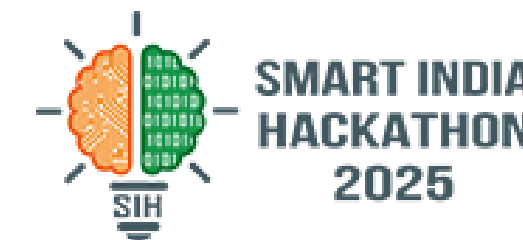
Economic Savings
\$4–5T cost reduction

Reduced Fatality
20–40% fatality reduction

Faster Research
Discovery time cut drastically



RESEARCH & REFERENCES



Sr. No	Author	Paper Title	Publication	Year	Link
1)	Jumper, J. et al.	AlphaFold: Highly accurate protein structure prediction	Nature	2021	https://www.nature.com/articles/s41586-021-03819-2
2)	Kokudeva, M. et al.	AI as a tool in drug discovery and development	Biotechnology & Biotechnological Equipment	2021	https://www.nature.com/articles/s41573-019-0016-z
3)	Deng, J. et al.	Artificial intelligence in drug discovery: applications & techniques	Briefings in Bioinformatics	2020	https://www.nature.com/articles/s41573-019-0016-z
4)	Vamathevan, J. et al.	Machine learning in drug discovery and development	Nature Reviews Drug Discovery	2019	https://www.nature.com/articles/s41573-019-0016-z

<https://tinyurl.com/bdhhfft6>

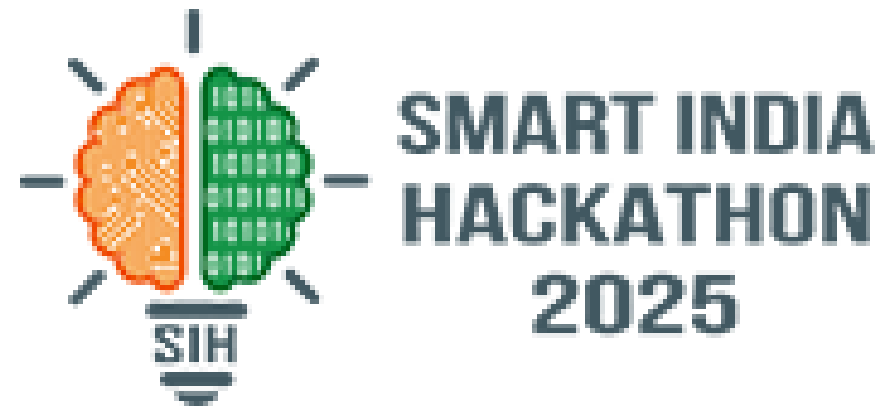
<https://viroai2.netlify.app>

“For more details about this project, please get to this link for detailed overview.”

Prototype Link

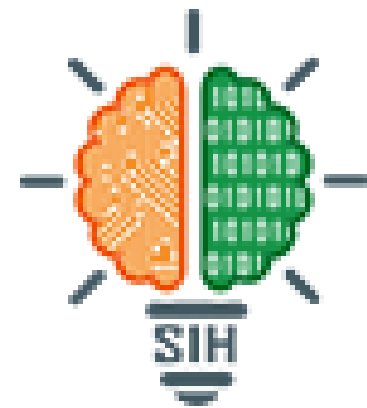


ANY QUESTIONS ??





THANK YOU



**SMART INDIA
HACKATHON
2025**