**JCP**

**Just a Capstone Project**

**Pitch**

If there is one thing 2020 has taught us, it’s that we won’t always have in-person access to the manufacturing floor. But even prior to the present-day pandemic, scientists/engineers have battled with the problem of saving time, money, and resources for high-throughput chemical manufacturing process optimization.

So here’s our solution: trained artificial neural networks to make quantitative predictions in a manufacturing pipeline in a user-ready and user-understandable interface to run virtually (say, in a work-from-home environment) -- and also run 1600 times faster than a more traditional mechanistic model.

At JCP we have built a framework for developing surrogate models. We load-in existing mechanistic models, generate data, train different TensorFlow models, and compare their performance for feature exploration analysis and visualization.

We have made a tool to do complicated calculations and modeling with a very simple and quick interface that is easy to get results from, easy to analyze and interpret, and can save chemical manufacturers a lot of time and resources.

So, check it out on GitHub. It is easy to install/setup.

**Project Pitch**

Problem: scientists/engineers have battled with saving time, money, and resources for high-throughput chemical manufacturing process optimization. Mechanistic models can provide insight on process optimization but are very slow and expensive to run.

So here’s our solution: surrogate models that are trained artificial neural networks to make quantitative predictions in a manufacturing pipeline in a user-ready and user-understandable interface to run 600 times faster than a traditional mechanistic model.

At JCP we have built a framework for developing surrogate models. We load-in existing mechanistic models, collect data using various sampling strategies, and finally train different TensorFlow models and compare their performance for feature exploration analysis and visualization.

We have made a tool to do very complicated calculations and modeling with a very simple and quick interface that is easy to get results from, easy to analyze and interpret, and can save chemical manufacturers a lot of time and resources.

So, check it out on GitHub. It is easy to install/setup.

If there is one thing 2020 has taught us is that we won’t always have in-person access to a full production room. But even prior to the present-day pandemic, scientists/engineers have battled with the problem of saving time, money, and resources for high-throughput chemical manufacturing process optimization.

So here’s our solution: trained artificial neural networks to make quantitative predictions in a manufacturing pipeline in a user-ready and user-understandable interface to run virtually (say, in a work-from-home environment) -- and also run 600 times faster than a traditional mechanistic model.

At JCP we have built a framework for developing surrogate models. We load-in existing mechanistic models, collect data using various sampling strategies, and finally train different TensorFlow models and compare their performance for feature exploration analysis and visualization.

We have made a tool to do very complicated calculations and modeling with a very simple and quick interface that is easy to get results from, easy to analyze and interpret, and can save chemical manufacturers a lot of time and resources.

So, check it out on GitHub. It is easy to install/setup.

If there is one thing 2020 has taught us is that we won’t always have access to a full production room, but prior to that scientists/engineers battle with the problem of saving time for high-throughput chemical manufacturing. Time is money and we’re here to save time for high-throughput chemical manufacturing. Most companies will have a mechanistic model to predict things such as yield and purity during purification of their desired compound (a synthetic molecule, a highly-specialized and designed organic monomer, or maybe—a therapeutic protein!) These mechanistic models most certainly take a very long time to run. Our team uses outputs and design features from the mechanistic models to train artificial neural networks to find optimal manufacturing conditions. Stakeholders will be able to parameters as necessary to

What should I say now? Something about visualization/interactivity?

We all know that *time is money*. For chemical manufacturing, most companies have mechanistic models (based on…) to predict things like yield and purity for whatever they’re trying to produce (relatable examples here), but these models take a VERY long time to run. So, **we** save these companies *time and money* by using the outputs and the design feature inputs from those models to train artificial neural networks which are used to come up with the same predictions. The neural networks take a small fraction of time and soooo much less computing power. This leads to less time spent optimizing parameters so that more energy is spent producing important chemicals/drugs/materials.

Our product allows the manufacturer to visually modify parameters within realistic ranges to observe how certain factors affect the end product. By removing the tedious efforts of

**Interface > Input > Mechanistic Model**

**Provide small timely example (relating to COVID) - just a mention**

**Outline**

* Hook/Problem
  + We don’t always have access to lab
* Solution
  + ANN to run virtually before trying things in lab and runs faster than mechanistic model!!
* Credibility/competitive advantage
  + At JCP we have a framework for loading mechanistic models
  + Use various sampling strategies to get data from the mechanistic model
  + We have a pipeline for training various TensorFlow models and comparing their performance
  + Feature exploration and analysis - visualization
* Close
  + Summary
    - We have made a tool to do very complicated things with a very simple interface (“clicky”).
      * Easy to get results from
    - State-of-the-art tools have a steep learning curve.
      * Our tool has shallow learning curve - easier accessibility to scientists/operators/engineers
    - Make novel technology user-friendly
  + Call-to-action
    - Check our GitHub, follow tutorial, easy install/setup, check JUST example/casestudy (“we have already partnered with…”)
    - Schedule demo with dash interface

If there is one thing 2020 has taught us is that we won’t always have in-person access to a full production room. But even prior to the present-day pandemic, scientists/engineers have battled with the problem of saving time, money, and resources for high-throughput chemical manufacturing.

So here’s our solution: trained artificial neural networks to make quantitative predictions in a manufacturing pipeline in a user-ready and user-understandable interface to run virtually (say, in a work-from-home environment) -- and also run 600 times faster than a traditional mechanistic model.

At JCP we have built a framework for developing surrogate models. We load-in existing mechanistic models, collect data using various sampling strategies, and finally train different TensorFlow models and compare their performance for feature exploration analysis and visualization.

We have made a tool to do very complicated calculations and modeling with a very simple and quick interface that is easy to get results from, easy to analyze and interpret, and can save chemical manufacturers a lot of time and resources.

So, check our GitHub. It is easy to install/setup. We have already partnered with Just-Evotec Biotherapeutics for antibody purification chromatography.

**Rubric**

**Hook/Intro**

What is the problem/opportunity that is being addressed? Why should your nontechnical audience care?

The presenters identified themselves and made the problem/opportunity and why it matters clear in a way that is creative/memorable. The audience is engaged and eager to know more.

**Target Audience**

Who will benefit from this project? How does the team envision it adding value for customers/stakeholder s/society?

Presenters clearly and succinctly describe: 1) who will benefit from the project; and, 2) how do they envision the results of their project making a difference for customers, stakeholders and/or society.

**Solution**

What is your solution?

Presentation provides: 1) appropriate depth and detail for audience; 2) ideas described in an especially novel/creative way that resonates with the audience; and 3) appropriate context is provided.

**Credibility/Competitive Advantage**

Why/how is your solution relevant and promising?

Presenters clearly and succinctly highlight 1) the market for the solution and how their solution fits within that market; 2) the project constraints/limitations; and, 3) what knowledge and skills they are bringing to the project.

**Close**

What are the key points you want the audience to take away?

The presentation: 1) summarizes no more than three key strengths of the solution, 2) includes next steps, 3) call to action, and 4) appropriate response to questions in an especially novel/creative way that is durable

**Delivery**

To what extent do the presenters use visual, verbal, and written communication techniques and time appropriately to ensure that their audience understands why and for whom their project matters and the project’s potential impact?

The presenters demonstrate mastery in all 7 areas: 1) communicating in ways that the audience can hear and understand the presenters’ words; 2) use of culturally responsive language; 3) visual aids enhance the presentation; 4) presenters’ appearance, eye contact, posture, gestures, and energy engage audience; 5) all team members are engaged; 6) the presentation is within the given time limit, and 7) effectively storytelling.