State of Vermont Artificial Intelligence Task Force

Meeting Minutes

November 29, 2018

Calvin Coolidge Conference Room, 6th Floor ACCD

12:00 p.m. - 4:00 p.m.

Members present: Michael Schirling; Milo Cress; Joe Segale; Brian Cina; Brian Breslend; Eugene Santos; John Cohn; Honorable John A. Dooley; James Lyall; Trey Dobson, MD; Mark Combs;

Members missing: Jill Charbonneau; Christopher Herrick; Donna Rizzo

Witnesses: Asim Zia; Steve Farrington; Scott Magnan; Chuck Ross; Paul Godin

Staff present: Kayla Dewey

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12:09

Meeting commences

- review meeting minutes from 10/12 meeting
- edit – spelling error
- motion to approve minutes with spelling correction passes

12:11

Presentation of the work of the Subcommittee on Natural Resources and Agriculture

- introduction of witnesses and format of presentation

- witness will provide (1) background on themselves, (2) how they see the current state of AI in their field, (3)benefits and risks of AI for the field, (4) recommendations on what the state should do to maximize the benefits and minimize risks.

- John C. distributes cookies for the meeting.

First witness is Asim Zia

- background in using technology to gather data for environmental issues.

- Example: using sensors to collect watershed data instead of time consuming and costly hand collections.

- AI is used in Dr. Zia's work for condensing and processing large amounts of data using models

Q: What is AI's role in these data and models?

- is AI doing critical thinking?

A: satellites are in use that collect data for an outlined area of landscape. When there is cloud cover or obstructions the models are able to make judgements to fill in the missing data.

Q: How does the machine learn?

A: the model updates its own rules as new information emerges

Definition of neural nets

- example: Taxes. At the end of the year and individual wants to know what taxes are owed. To find this out, she inputs earning, expenses, etc. that affect how much she will pay. A neural network is linear because she is asking one question: how much is owed, but more questions could be asked that will affect the answer. AI asks its own questions, which brings more variables into consideration, which affects the answer.

AI could help understand situations and inform decisions opposed to making the decision instead of the policy maker. Autonomous vehicles demonstrates how this might not end up being in all situations.

Digitization of the government.

- Example: reviewing and approving applications without a human involved

- Downside: data misuse, deliberate manipulation of data sets, hackers

Q: What is a specific example of how AI could save tax money with regard to natural resources?

Answer: In natural resource management, we are currently relying on imperfect human judgement to make decisions. We could deploy sensors to collect from more data points simultaneously. As long as the data is secure, a system could make more accurate decisions. AI use for managing natural resources could be more efficient.

Governments could monitor follow through with how funds are being used. Example: payments to groups to reforest the rainforest. With technology, a government could monitor if groups are using funds as directed. A validation of a policy and how it is implemented.

Emergency management. Government could send drones into a forest fire to identify where to send resources to be most effective.

Q: Should we trust AI? Who is "we?" Who gets to decide the state of AI, allow, control and act on data from the AI?

A: Commissions, those with vested authority, citizens are sometimes put in this position. Commissions and decision making authorities also might delegate responsibilities.

AI can have variable accuracy. People have varying levels of comfort depending on the application. Example: A robotic surgeon might require a 99% accuracy, but we might tolerate less accuracy for other tasks.

Q: What would we do to enforce, monitor, and entrust robots to maximize benefits and minimize risks?

A: Encourage public engagement. Leverage technologies for early warning systems and natural resource monitoring.

Q: What should the state do?

A: Mainstream early warning systems. Begin planning the infrastructure for technology.

1:02

Debriefing with Asim and request for feedback as the task force's first witness.

1:04

Introduction for Steve Farrington of Transcend Engineering

Q for task force: What area/definition is the task force focusing on?

A: Group has no idea, so we don't have an answer.

Overview of Stephen's work

- An example includes determining the depth of ground water based on terrain variables using radar that reads electronic pulses that are affected by moisture levels in the soil. This information is important to understand climate change by also monitoring what is happening underground or for making judgements about slope stability to better predict landslides.

Q: Does Vermont government support your work? Does the state undermine you? Should the state do something about AI in your field?

A: The short answer is that there are a lot of better places to do this work, but UVM is a real benefit and creates a lot of vibrance and innovation for the state.

Q: is there an opportunity for tech to create a solution for working with the bureaucracy?

A: government is participatory and includes the populous. It does not move quickly enough. Created policies will be outdated before they're even operational

Q: AI is useless without data, but who owns the data? Sensors are the source of data. Is there public or private discussion of that data? Does the public need to know what sensors are out there?

A: There are lots of issues with AI. Example: The Singularity, when AI becomes smart enough that it can self improve and outruns human intelligence. There is a potential for unintended consequences, which is an accepted practice in legislation. Legislators create a law and see what problems emerge and then go back and fix the problems.

The tech in certain applications and uses are essentially magic. People don't understand its control and influence on their lives. Examples: average 6.5 hours a day spent on social media, telemarketers that seem human, social media algorithms, social media controlling individuals' exposure to the world. It is not the platform, it is the algorithms that control exposure to the world, which are problematic.

Q: How can the State maximize the benefits of AI and minimize the risks in your field?

A: I have no specific prescription. There is an asteroid approaching Earth, which cannot be swatted away. The State should find ways to nudge it in the right direction. The State must examine different use cases, encourage others to convene scenario planning workshops and find the nudge points to direct application of AI. The State ought to be interested in growing business around the tech.

Q: What about Education?

A: The State should do anything to educate public on AI.

Best way for State to inoculate itself against adverse effects. Anything you do, business is going to find a way around it. Business will conform itself to the letter of the law but not the spirit of it.

1:37

Introduction for Scott Magnan of Scott Magnan Services and Precision Agriculture

Scott sells technology for farmers to help manage their fields

Examples: Data gathered using tech can be used to create a digital map of an area to record how much manure has been applied over an area.

With corn or beans, the tech has the capability to track every seed that has been planted.

Fertilizer application can been closely monitored by area.

Using yield data, a farmer can get a clear picture of how much crop is taken from the land and which area may be the best for growing or she might make a plan of how to disperse nutrients more effectively.

Q: Can these new products be used with existing farming equipment?

A: Yes

Q: Does the software learn?

A: Not sure. The software uses algorithms.

Q: Is data shared outside of the farm?

A: Farmers own their data and are able to be shared with advisors if the farmer chooses.

Q: Is VT a good place to be in business?

A: The cost per acre is higher in Vermont compared to other places. There are additional challenges such as working with non-uniform plot shapes and soil variability.

Q: What relationship with the state does this industry have? Is there support, regulation?

A: There are seed grants and other forms of capital assistance. These technologies are good for record keeping and complying with the grants, but it brings up the questions of how much data should be sent to the state. To what extent should farmers be reporting?

The Dept. of Ag is also a regulatory body. It is unclear who should have access to the data.

Q: Is it a competitiveness? What's the concern with sharing info?

A: What if we're over manuring? Do we share that information with the regulatory agency?

There is talk of making flow meters mandatory. The downside is that tech is expensive and sometimes not necessary for farmers who can monitor water usage without tech. This applies especially to small farms.

Not in favor of making monitoring tech mandatory.

The start up cost is $10,000 – $50,000.

Q: Is this the future?

A: We will see increased uses in organic farming.

Q: What are the risks?

A: The upside is that farmers will be less fatigued using equipment.. Multi tasking farmers will have one less task to do.

Another potential is that there may be smaller units that all work together instead of one large tractor, which might reduce compaction.

Q: What about drones?

A: This is safer for the operator when applying chemicals.

Q: Is the price dropping? What's the ROI?

A: Right now the price is going up as tech keeps improving.

Sales trends for the business is also increasing.

Q: Are you using other data? Satellite data or weather prediction?

A: No

Q: What else should the legislature know?

A: Educational outreach and informing the public is important and necessary.

2:08

Introduction of Paul Godin of Lely Center, Dairy Automation

The background

- There are currently 70 milking robots in Vermont

- 150 over a few New England states

- this tech has increased milk production by 20% and labor by 50% retaining a better quality farm worker and eliminating undesirable tasks

- cows are much healthier and living longer

- farmers and cows are enjoying a better quality of life all around

- these robots are 180,000/unit. Return is 5-7 years

- The land in Vermont is expensive

- labor is a challenge. There are few people who want to work milking cows full time. Vermont demands higher wages for workers in these positions

- Machine learns when the cow will be ready to milk again and controls when she will get milked.

Q: Can the tech monitor cow's nutrition?

A: Not yet, but it is developing in that direction.

Q: Do the cows decide when they'll get milked?

A: It is a voluntary system. The cows will decide to get milked on their own. The farmer can get stats available on her mobile device about who is getting milked and who needs to get milked still.

Q: How visible is it that it is learning? Why do you think it's AI?

A: The machine is learning from itself and making changes. Example: It will makes change with nutrition to optimize milk production

Q: This tech reduces labor cost, but are these jobs that are hard to fill anyway?

A: This is taking away the most labor intensive part of dairy farms. Every farm struggles with labor and retaining employees. This machinery was originally created to address the labor problem. Cow milkers are at the bottom of the labor force and have an impact on everyone else.

This tech is retaining the next generation, who don't want to do labor anymore. This generation wants a robotic solution to drudgery. This tech is creating better jobs and saving the industry.

Q: There are lots of benefits. Low wage jobs are being replaced by machines in this example.

What is the wage range of the jobs being replaced? How many jobs in VT does this impact?

A: $5 - $15 because there are long hours and workers are not paid overtime.

There are 40 farms with robots and 20 jobs were displaced

Some bought the robots to keep the farm viable and to update their antiquated technology.

This tech is eliminating some jobs and improving the quality of other jobs.

Farms that are more profitable farms might reinvest in other things.

There are now able to compete with farms in Kansas.

Q: what should we tell the state?

A: This industry benefits from Efficiency Vermont's involvement.

- There is a lot of tech that are super efficient- some tech is more energy efficient, cow friendly, and uses less water and chemicals to clean equipment

- this tech is improving farm retention

- we want to keep fields open. The geography doesn't support huge farms. We need many small farms open.

The State could provide incentives for farms to purchase robotic milking units.

Q: what could the State base an incentive on?

A: Energy savings and environmental factors

Q: Is there a better conversion of feed to milk?

Q2: With regard to the geographic disadvantage. If tech is making its way to the west, won't we again be disadvantaged?

A: Having units locally helps retain the local market. Transporting milk is getting efficient, but we want to save our local farms.

The State currently has less than 700 farms

11% of dairy farms have gone out of business just this year

70-80% of the farm gate receipts come from dairy.

Dairy farming is the backbone of agriculture in Vermont which other areas rely.

Q: Could Vermont be a place where we invest in technologies as an innovation center?

A: Lely came to Vermont because of the small farm model in Vermont.

Farmers want this tech but need funding.

2:45

Introduction of Chuck Ross of UVM Extension Service

GoCrop uses AI and nutrient management technology to plan manure application.

Products can collect data for what conditions does phosphorous leave the field and if so how much?

Who owns the tech and who owns the data and how much is it going to cost?

Q: Do you think the government should work on legislation for who owns data?

A: If you trust your builder you want them to have the key to your house. In farming, if your equipment supplier has a great maintenance shop, you want him to be able to quickly access your data and fix a problem. Would this give him too much control? Is he the only one who can fix it and what if he charges higher prices because his services are scarce?

Why is this technology different? There are power and control issues and issues with trust. What are the differences here? Is this a conversation that needs to be ongoing?

When do I lose control for making decision about my own operation and when am I asking permission from a service provider? When you have data, who has access to the data- a regulator, service provider, or individual?

If data is being marketed. Does the individual get a cut of the profits?

Large data sets are valuable in aggregate but only worth a bit for each individual.

Farming could evolve to farmers being just a technology manager. The feeling of "my land," "my farm" might be different.

Robots are doing work that a well informed farmer does and better.

Land and farm ownership could go away.

The game theory problem presents here, when the only way to increase income is to increase production. When we increase production we flood market, which reduces profit yields.

Q: what's the goal? Optimizing milk production? Quality of life and prosperous farmers because

AI can automate capitalism..

You can use AI to optimize anything, but framing the problem correctly.

3:19

Group discussion

Q: Could Vermont become a locus of innovation?

What could we do legislatively? What are the financial limitations? How proactive should we be about making this a state priority?

A: Maybe AI should be a State priority. It depends on who wants to step up and what the AI idea is.

Decision Makers ← Power←→ AI ←→ Ecology ←→ Decision Makers

AI can create a concentration of power

power can influence the decision maker

decision makers are the guardians of ecology

We could say that good AI will solve this by managing the ecology very well, but is AI ever going to be sophisticated enough to do this?

This is all - Game theory, the prisoner's dilemma

AI is a tool that will never fix a problem but it could help you understand a problem

Next meeting – The task force should start with a discussion or the previous meeting.

3:30 Committee Discussion

1/11 meeting rescheduled for 1/18

How many witnesses should the transportation, etc. subcommittee call?

- panel format?

- maybe ten minutes for each witness and then a 1 hour panel

Synthesis - Request for each member to contribute on Slack key take always from the meeting

Donna and John C. will write about it and ask for feedback on Slack

Is Slack the best way to communicate?

Public Access coverage of meeting-

Should we have Public Access of Washington County come to the next meeting?

Motion to contact public access and invite them to attend meetings

Second

- Presenters need to be informed of television presence. It might effect the testimonies.

If public starts attending there will need to be boundaries so that the meeting does not get taken over.

Concerns for disruptions

Motion passes unanimously

Agendas should include an opportunity for public comment either at the beginning or end of the meetings (10-15 minutes) and each individual should have a time allotment.

The agenda should include an item to make adjustments to the agenda

Interim progress report is due at the end of February

When does the group want to start the report?

The report just needs to demonstrate that we're meeting, active, and engaged - a chronological account and what the plans are for going forward

Kayla will write the draft and include:

- dates we've met
- witnesses we've heard from
- 1 paragraph summary of the meetings – what we have covered
- upcoming dates and topics
- a request for more time if needed

June 30th is the deadline for the larger report

Homework assignments and next steps discussion

Definitions should be added to the agenda for next month

Getting on Vermont Edition early spring?

- Milo to follow up

- public engagement is needed

- subcommittee on public outreach needs to meet again

4:00 committee adjourns