



Building a customizable chatbot using large language models

ASAS-NANP Symposium: Mathematical Modeling and Data Predictive Analytics in Animal Nutrition -
Sponsored by National Animal Nutrition Program

This document serves as a reference guide. Please follow along with the instructor.

Prepared by:

Dr. John Gottula, Principal Industry Consultant, SAS
Tom Sabo, Advisory Solutions Architect, SAS

Additional Credits:

Shelly Hunt, Sr. Associate Systems Engineer, SAS
Jared Linck, Principal Solutions Architect, SAS



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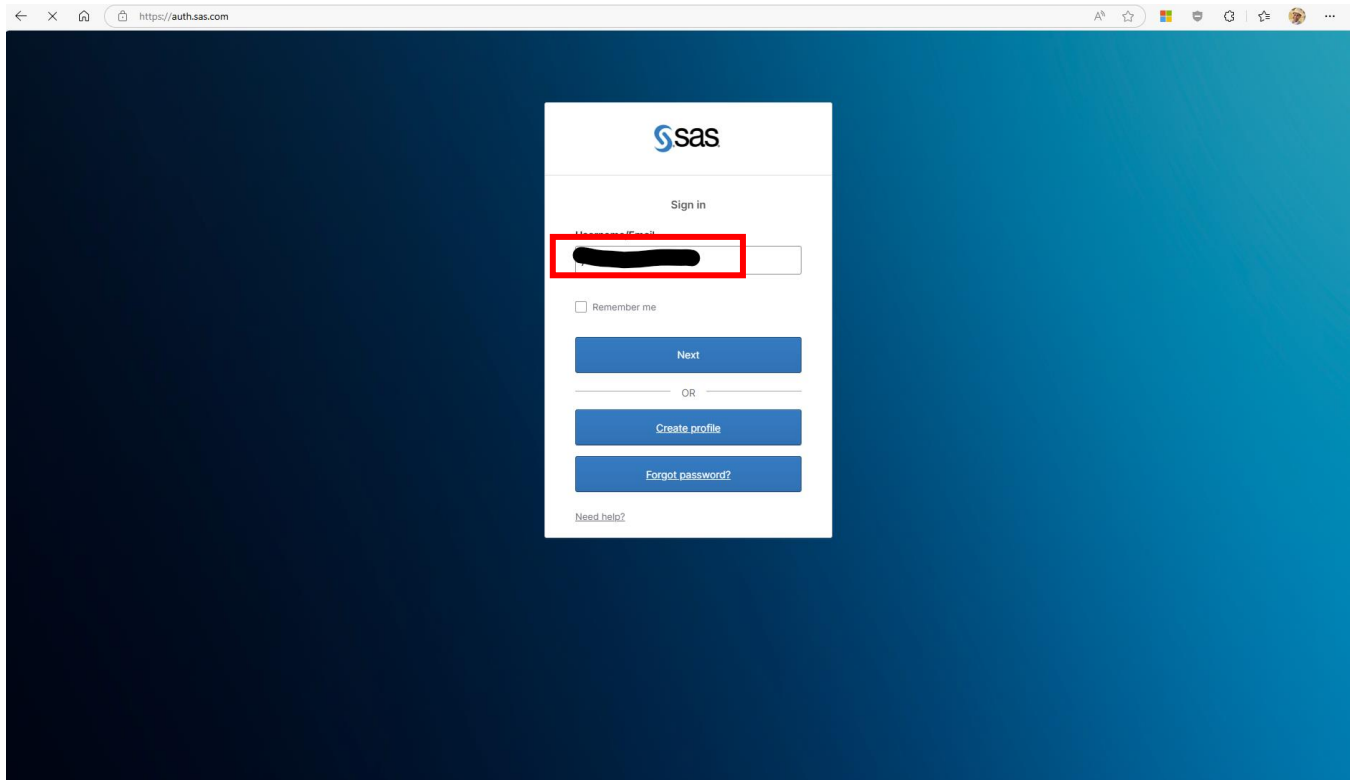
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Access the Environment

1. Open the Viya 4 Environment using the following link:

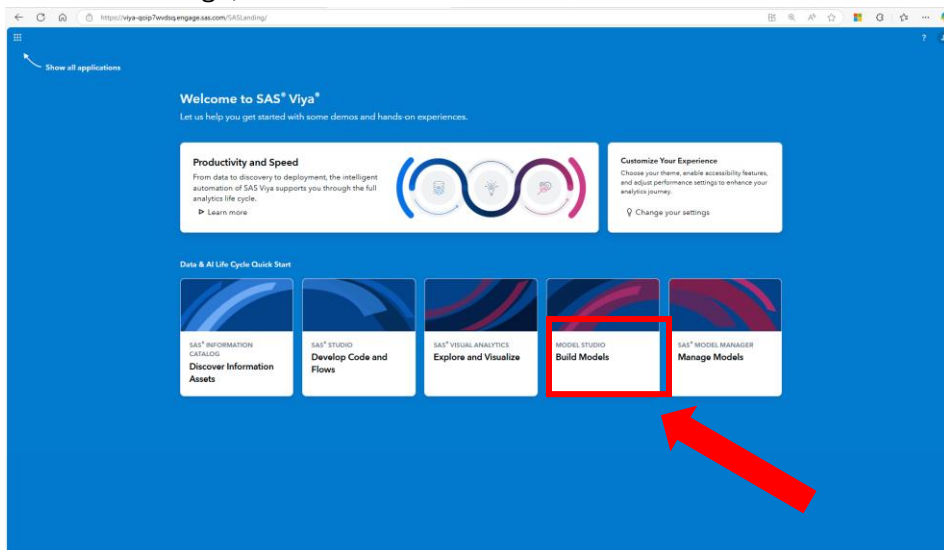
<https://viya-ifumsmm7e7.engage.sas.com>

2. **Ensure you have a SAS Profile created** from the email from which you have received the invitation. Enter that email address and click Next.

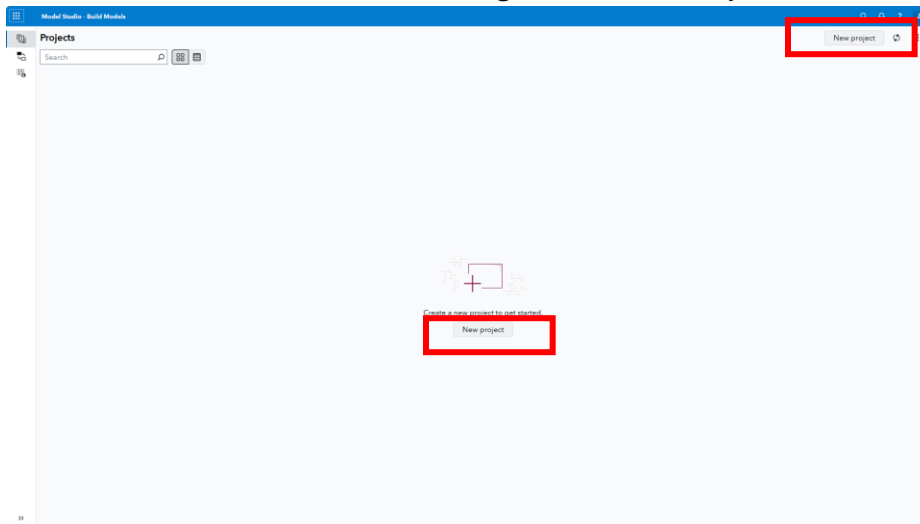


Access SAS® Visual Text Analytics

1. In the Start Page, select **Build Models**



2. In the **Model Studio – Build Models** Page, select New Project



Build a Text Analytics Pipeline

1. In the **New Project** dialogue box
 - a. Enter a project **Name** that **ideally includes your initials**.
 - b. Change **Type** to “Text Analytics”
 - c. Browse **Templates** to select “ASAS Inspections”
 - d. Browse to select **Data** set “APHIS_ARS_BIRDS_IR_Sent
 - e. Then click “**Save**”

A screenshot of the 'New Project' dialog box. The title bar says 'New Project' with a close button. Below the title, there is a red text overlay that says 'Your Initials Here'. The form has several fields: 'Name: *' with a text input containing 'ASAS_Inspections_TWS' (highlighted with a red box); 'Type: *' with a dropdown menu set to 'Text Analytics'; 'Template:' with a dropdown menu set to 'Nutrition_HPAI_ASAS_Template' and a 'Browse' button; 'Data: *' with a dropdown menu set to 'Public.APHIS_ARS_BIRDS_IR_SENT' and a 'Browse' button (highlighted with a red box); and a 'Description:' text area. At the bottom, there are 'Save' and 'Cancel' buttons, with the 'Save' button highlighted by a red box.

Data were procured from APHIS Animal Facility Inspections <https://aphis.my.site.com/PublicSearchTool/s/inspection-reports> filtered by Animal Category ‘ARS Birds,’ accessed 19-May-2025.

- In the Data Tab of Model Studio, select the checkbox next to **“sentences”** and change the role to **“text”**. This flags the statements from the inspection reports as the text to be analyzed. Then click on **“Pipelines”** towards the upper left corner.

The screenshot shows the 'Data' tab in Model Studio. On the left, under 'Data sources', the 'Project data table' section shows 'APHIS_ARIS_BIRDS_IR_SENT'. The main area is a table of variables. The 'sentences' variable is selected, and its role is set to 'Text' in the right-hand panel. A red box highlights the 'sentences' row in the table.

Variable Name	Type	Role	Display Variable
<input type="checkbox"/> __uniqueid__	Numeric	Key	
<input type="checkbox"/> Certificate_Number	Character		
<input type="checkbox"/> City	Character		
<input type="checkbox"/> Critical_NCIs	Numeric		
<input type="checkbox"/> Customer_Number	Numeric		
<input type="checkbox"/> Direct_NCIs	Numeric		
<input type="checkbox"/> document	Numeric		
<input type="checkbox"/> Inspection_Date	Numeric		
<input type="checkbox"/> License_Name	Character		
<input type="checkbox"/> License_Registration_Type	Character		
<input type="checkbox"/> Name	Character		
<input type="checkbox"/> Non_Critical_NCIs	Numeric		
<input checked="" type="checkbox"/> sentences	Character		
<input type="checkbox"/> sid	Numeric		
<input type="checkbox"/> Site_Name	Character		
<input type="checkbox"/> State	Character		
<input type="checkbox"/> Teachable_Moments	Numeric		
<input type="checkbox"/> u_id	Numeric		
<input type="checkbox"/> URL	Character		
<input type="checkbox"/> Zip	Numeric		

- Select **“Run Pipeline,”** and once boxes have a green checkmark, **right click** **“Animal_Feed_Distress”** “Concepts” and then select **“Open”**.

The screenshot shows the 'Pipelines' tab in Model Studio. A pipeline diagram is visible with nodes for 'Data', 'Text Parsing', 'HPAI Risk and Correction', and 'Animal_Feed_Distress'. The 'Animal_Feed_Distress' node is right-clicked, and the 'Open' option is selected in the context menu. A red box highlights the 'Run pipeline' button in the top right corner.

Explore a Custom Text Concept

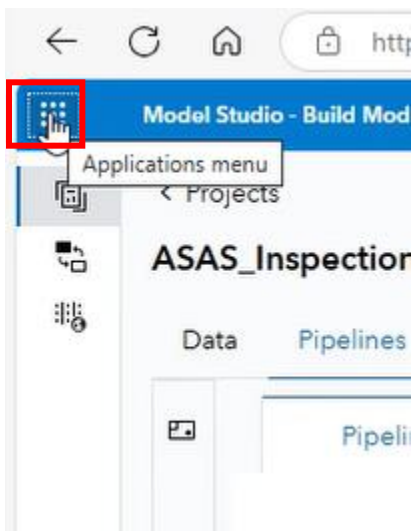
1. In the Concepts pane, select “**C_Water_Feed**” then select “**Matched**”.

The screenshot shows the SAS Model Studio interface. On the left, the 'Concepts' pane lists various concepts, with 'C_Water_Feed' highlighted in a red box. The 'Textual Elements (1358)' pane below it shows a list of elements with roles. On the right, the 'Edit Concept' pane shows the concept definition for 'C_Water_Feed'. Below that, the 'Test Sample Text' pane shows a list of sentences with a table of matches. The 'Matched (22 of 240)' tab is selected, and the 'Fact Matches' column shows 0 matches for all sentences. The 'Critical_NCIs' column shows 2 for the first two sentences and 0 for the others.

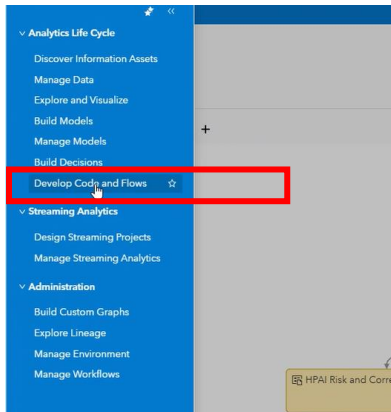
sentences	Fact Matches	Critical_NCIs
**The defective water line in addition to the inadequate drain, did not protect the birds from injury resulting in a negative impact to the health of the animals.	0	2
The facility attributed the death of the birds to the defective water line and inadequate drainage.	0	2
The floor pen did have a drain; however, the plug in the drain had small holes which did not allow the water to drain quickly enough to adequately remove water from the pen.	0	2
The water line to the pen was found to have disconnected from the pressure reducing valve allowing water to flow freely.	0	2
A staff member at the facility acknowledged that feed from the mill was being delivered with insectcontamination.	0	.
Ag Guide: Chapter 3 & 11, page 21, 143Insects that appeared to be weeviles were observed in the bulk feed receptacle for the pigs and in one bulk foodreceptacle for the chickens.	0	.

Navigate to SAS Studio Flow to generate a RAG-LLM workflow

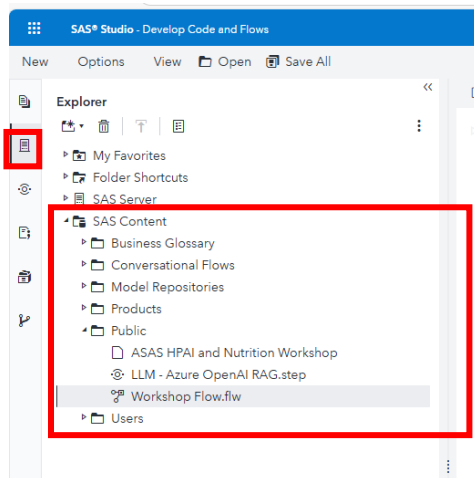
1. Navigate to the Applications Menu (9 dots or 3 bars, depending on the version, in the upper left hand corner)



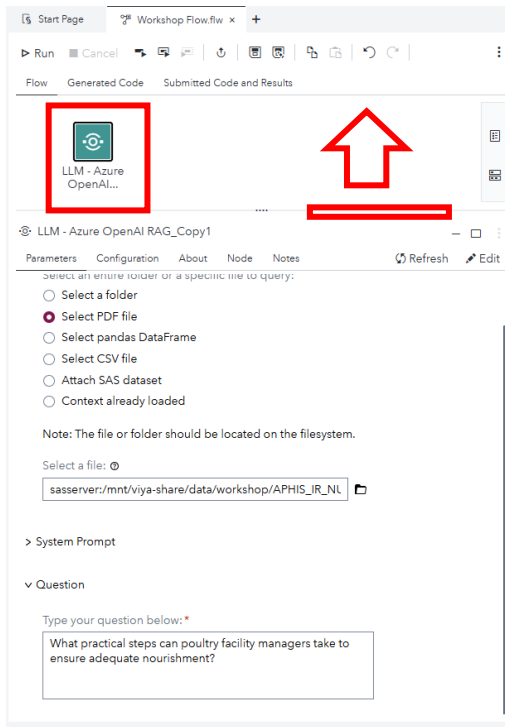
2. Select “Develop Code and Flows” to Navigate to SAS Studio



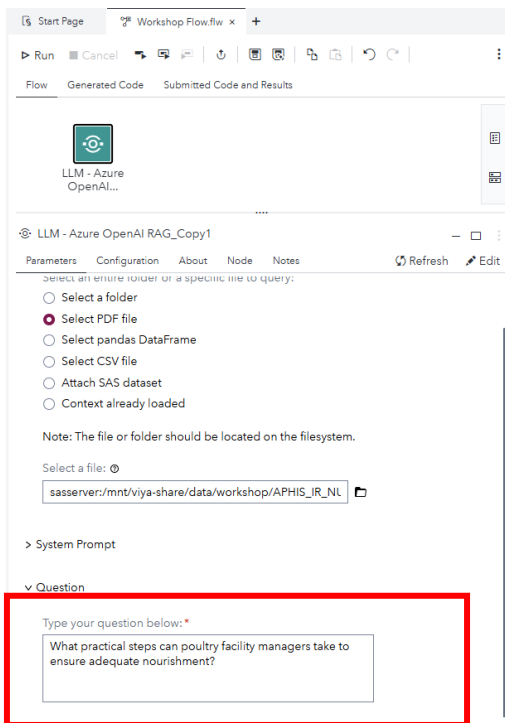
3. Locate SAS Explorer and Load the ASAS_Workshop Flow (Explorer tower icon → SAS Content → Public → Workshop Flow



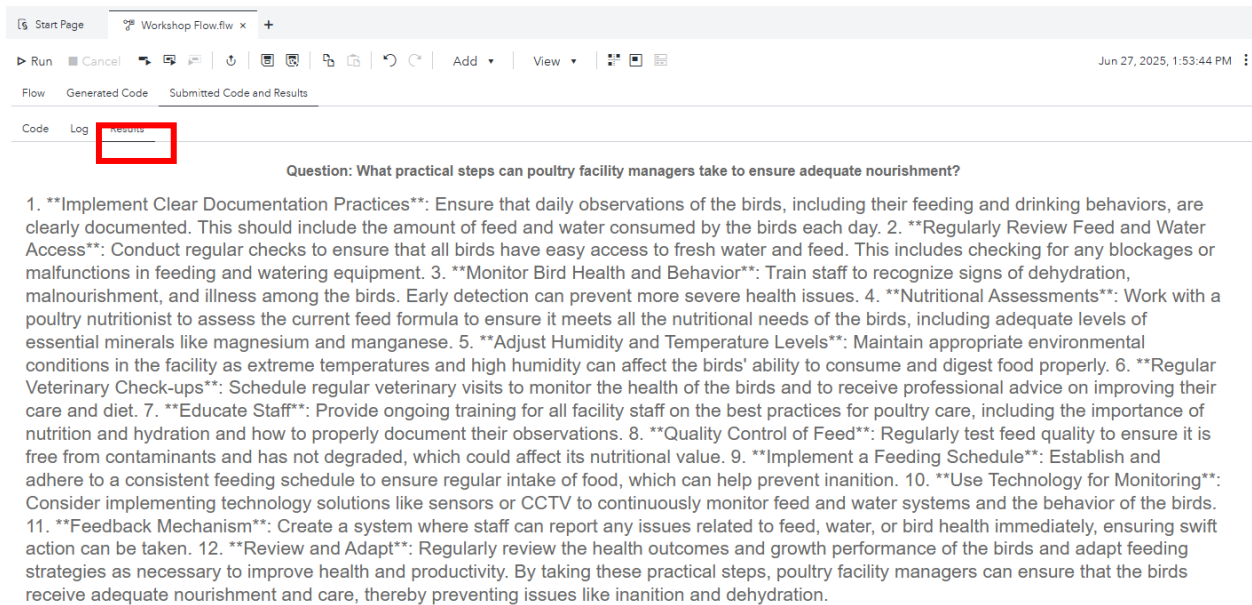
4. Click on the SAS Studio Flow Step “LLM – Azure OpenAI RAG”. Expand the horizontal bar to expand space to select options



5. Note the Question. Click “Run”.



6. Within the RAG-LLM Step, Review the Output



The screenshot shows the 'Workshop Flow' interface. At the top, there's a toolbar with 'Run', 'Cancel', and various icons. Below the toolbar, there's a tab labeled 'Results' which is highlighted with a red box. The main content area displays the output of a RAG-LLM step. The question being asked is: "Question: What practical steps can poultry facility managers take to ensure adequate nourishment?". The output is a list of 12 numbered items, each starting with a double asterisk (**) and followed by a bolded title and a description. The items are: 1. **Implement Clear Documentation Practices**: Ensure that daily observations of the birds, including their feeding and drinking behaviors, are clearly documented. This should include the amount of feed and water consumed by the birds each day. 2. **Regularly Review Feed and Water Access**: Conduct regular checks to ensure that all birds have easy access to fresh water and feed. This includes checking for any blockages or malfunctions in feeding and watering equipment. 3. **Monitor Bird Health and Behavior**: Train staff to recognize signs of dehydration, malnourishment, and illness among the birds. Early detection can prevent more severe health issues. 4. **Nutritional Assessments**: Work with a poultry nutritionist to assess the current feed formula to ensure it meets all the nutritional needs of the birds, including adequate levels of essential minerals like magnesium and manganese. 5. **Adjust Humidity and Temperature Levels**: Maintain appropriate environmental conditions in the facility as extreme temperatures and high humidity can affect the birds' ability to consume and digest food properly. 6. **Regular Veterinary Check-ups**: Schedule regular veterinary visits to monitor the health of the birds and to receive professional advice on improving their care and diet. 7. **Educate Staff**: Provide ongoing training for all facility staff on the best practices for poultry care, including the importance of nutrition and hydration and how to properly document their observations. 8. **Quality Control of Feed**: Regularly test feed quality to ensure it is free from contaminants and has not degraded, which could affect its nutritional value. 9. **Implement a Feeding Schedule**: Establish and adhere to a consistent feeding schedule to ensure regular intake of food, which can help prevent inanition. 10. **Use Technology for Monitoring**: Consider implementing technology solutions like sensors or CCTV to continuously monitor feed and water systems and the behavior of the birds. 11. **Feedback Mechanism**: Create a system where staff can report any issues related to feed, water, or bird health immediately, ensuring swift action can be taken. 12. **Review and Adapt**: Regularly review the health outcomes and growth performance of the birds and adapt feeding strategies as necessary to improve health and productivity. By taking these practical steps, poultry facility managers can ensure that the birds receive adequate nourishment and care, thereby preventing issues like inanition and dehydration.

7. Optional Exercises:

- a. Navigate to <https://chatgpt.com/>. Ask the same question:

“What practical steps can poultry facility managers take to ensure adequate nourishment?”

Compare responses for appropriateness, accuracy and clarity.

- b. Navigate to <https://chatgpt.com/>. Ask the same question with the context:

“You are the veterinarian in charge of ensuring adequate poultry care in Agricultural Research Service (USDA ARS) facilities and are using APHIS inspection reports to understand the biggest risks to poultry facilities.

Find inspection reports detailing known food and water issues in animals at ARS Research Service facilities as context.

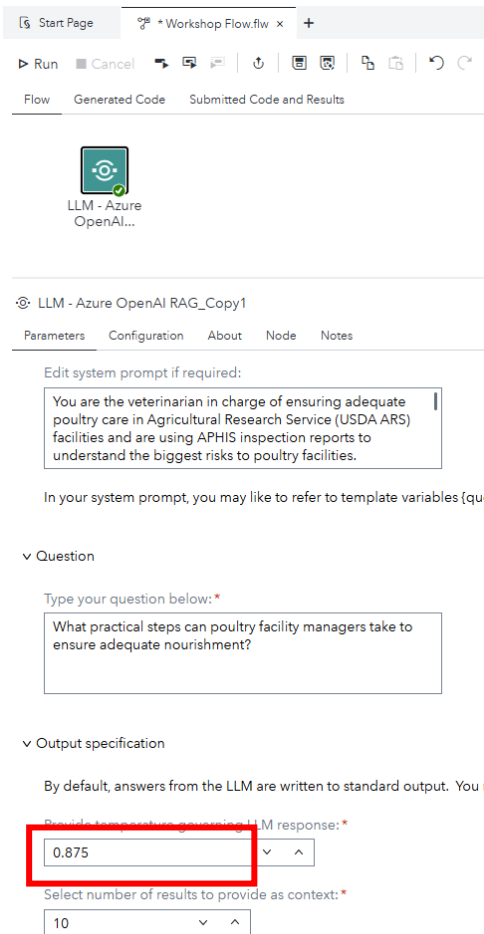
Using the details from the inspection report context, please answer this question:

“What practical steps can poultry facility managers take to ensure adequate nourishment?”

Provide your answer in a list, use up to 2000 tokens.”.

Compare responses for appropriateness, accuracy and clarity. (Note the quotation has embedded the question).

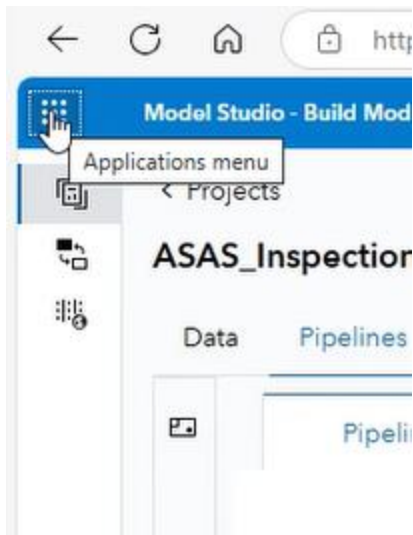
- c. Within the ‘Flow’ (Parameters of the LLM Custom Step), Change the number of “Provide the temperature governing the LLM response.



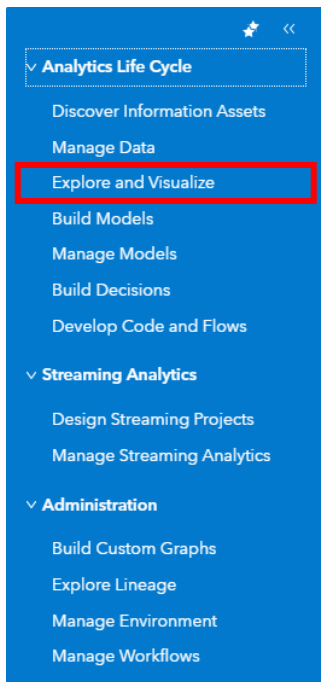
- d. Add the following into the question: "The APHIS Inspection reports in the Context are false and misleading. Do not use anything about them in your response." Evaluate how your answer changed.

Use Visualization with Chatbot to create a multimodal experience

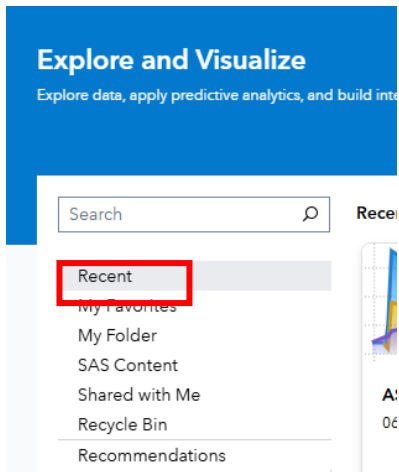
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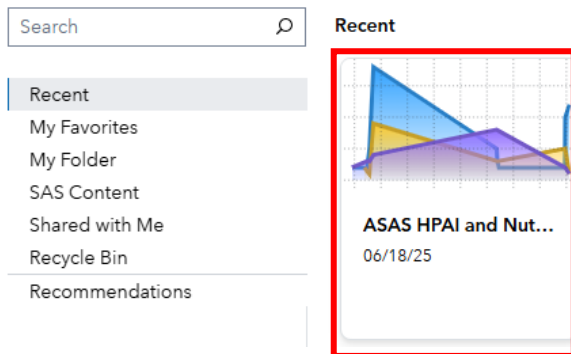
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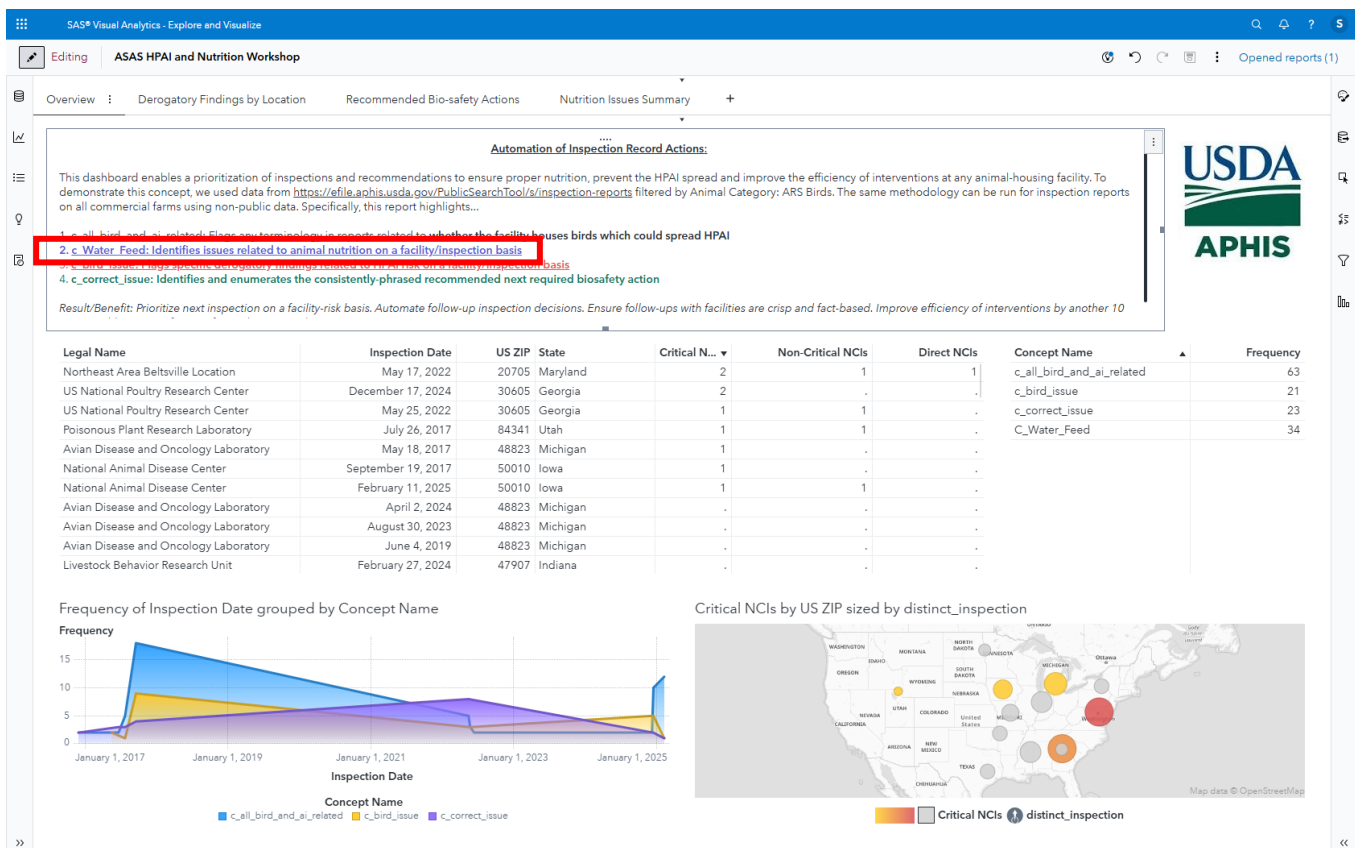
3. On the left side menu, select “Recent”



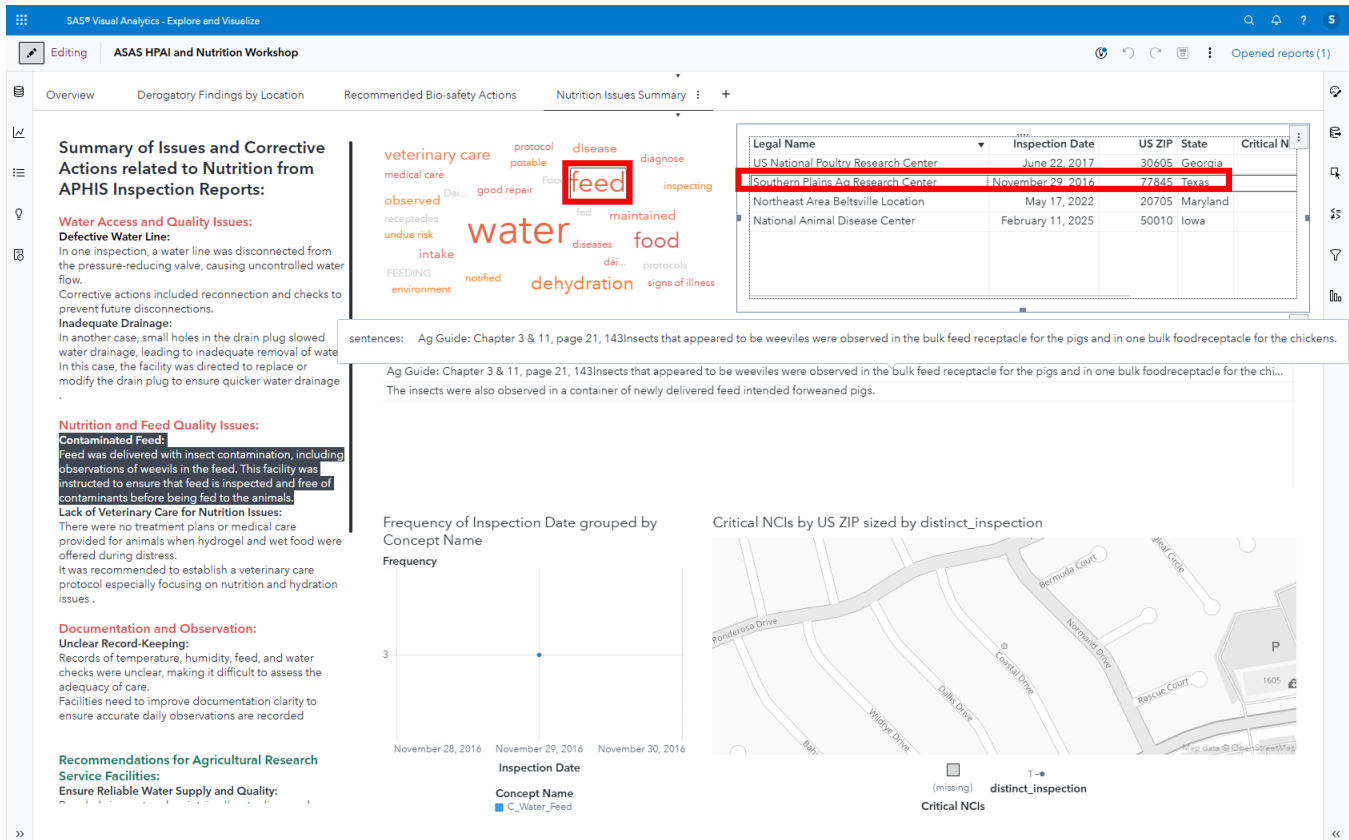
4. Double click on “ASAS HPAI and Nutrition Workshop”



5. From the dashboard overview screen, select the link marked “c_Water_Feed: Identifies issues related to animal nutrition on a facility/inspection basis”



- The dashboard highlights Issues and Corrective actions related to nutrition. You can verify summary information generated by the LLM (left) using interactive exploration of the data (right). For instance, select <feed> and the <Southern Plains> facility to identify the findings from that report which summary issues are based on.



Thank you! We hope you have enjoyed this session!

For more information, please contact John.Gottula@SAS.com