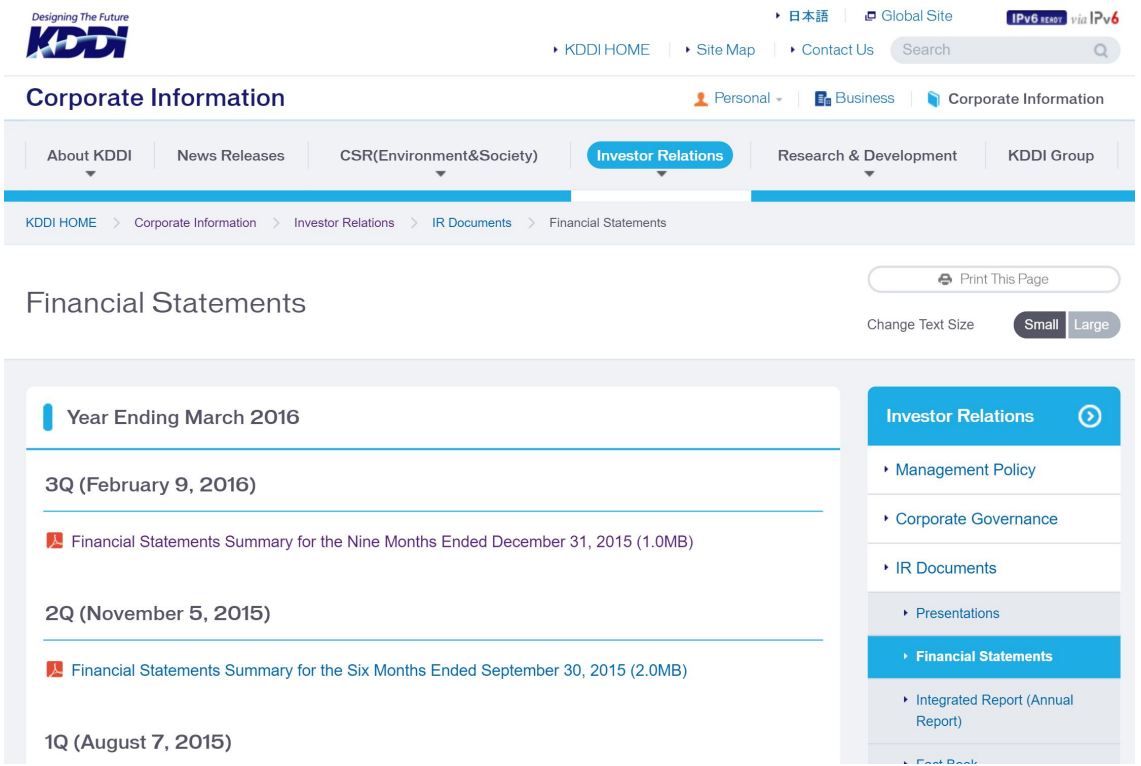
BESST MT Pilot Project

Ben, **E**mily, **S**am, **S**huwen **T**eam

Background

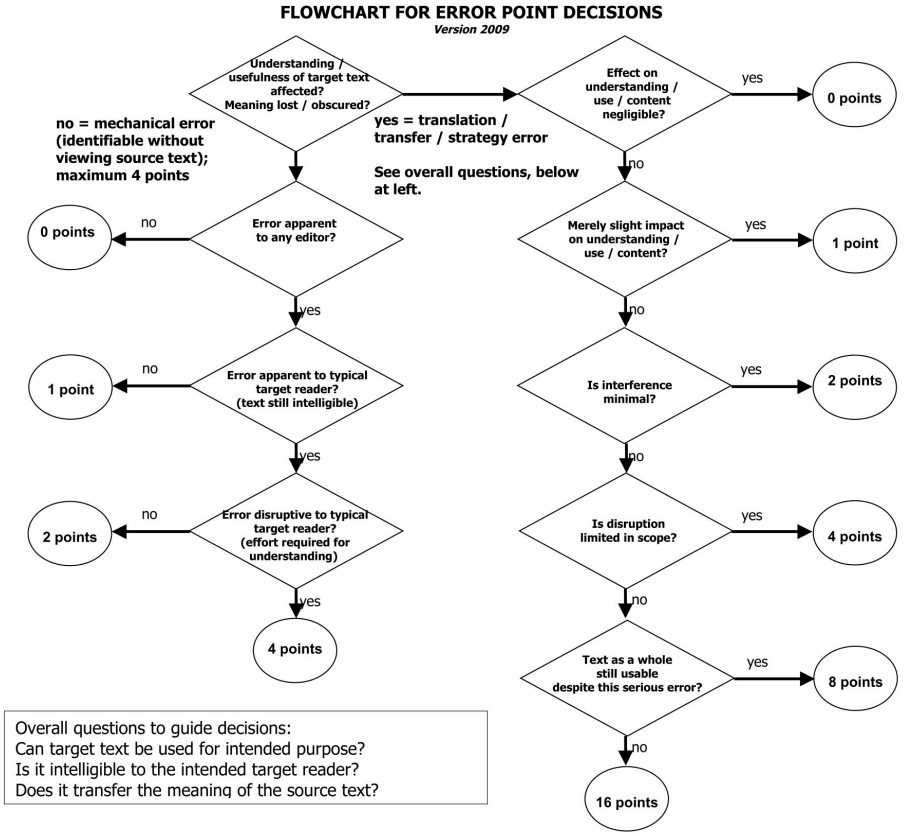
Financial Statements, Japanese to English

- KDDI Financial Statements
  - 2003 - 2015
- Softbank
  - 1999 - 2015
- Docomo
  - 1998 - 2015



Initial Goals

- Quality
  - Almost good enough for ATA
- Efficiency
  - 70% faster than human translation
- Cost
  - 70% cheaper than human translation



Machine Training Chart

1	0	**Training**: 2010 - 2015 Softbank financial reports (except for 2012q3 and 2015q4 - problem with files) pdfs: 10,670 segments **Tuning**: AU's Financial Statements for Years Ending March 2014 and 2015 (8 docs) pdfs: 2,731 segments **Testing**: AU's Financial Statements for Year Ending March 2016 (3 docs) pdfs: 2,013 segments	14.36	Emily
2	1	Added Softbank annual reports for 2015 and 2014	14.66	Sam
3	2	Added 8 KDDI financial statements	14.63	Ben
4	2	**Training**: Added Softbank financial reports for FY 2009 and FY2008 (unselected those with high attention marks) **Tuning**: Softbank and KDDI (those with higher similarity in parellel sentece)	10.75	Shuwen
5	2	Training: No change Tuning: Converted pdfs of AU 2015 year end statement to RTF and cleaned up files (removed images, headers, footers, and sections of English translation not found in original). Also removed all numbers and most symbols. Ran files through aligner (used MemoQ) and then cleaned alignment for ~2 hours.	14.05	Emily
6	2	Added Docomo Annual Report HTML files	16.85	Sam
7	6	Realized that our testing data was pretty awful so I tried to run some OCR on the Japanes PDFs in order to have all of the text picked up and actually represented in words/sentences. Before, it looked like there was a space in between every single character in the Japanese. I only did it on one of the documents, but we'll see if it helps at all.	18.18	Ben
8	7	**Training**: SB doc files, html, tmx **Tuning**: KDDI doc files	15.51	Shuwen
9	7	**Training**: added monolingual docs (2015 10k reports from Verizon, Sprint, T-Mobile, and AT&T)	19.03	Emily
10	9	More of what I did before with trying to clean up our testing data, because it wasn't very clean, this wont be perfect but it should be a lot better than what it was before. Its the same "data" just hopefully easier to segment and hopefully provide better results	22.03	Ben

Results

Initial BLEU score : 14.36

Best BLEU score: 22.03 (53% increase)

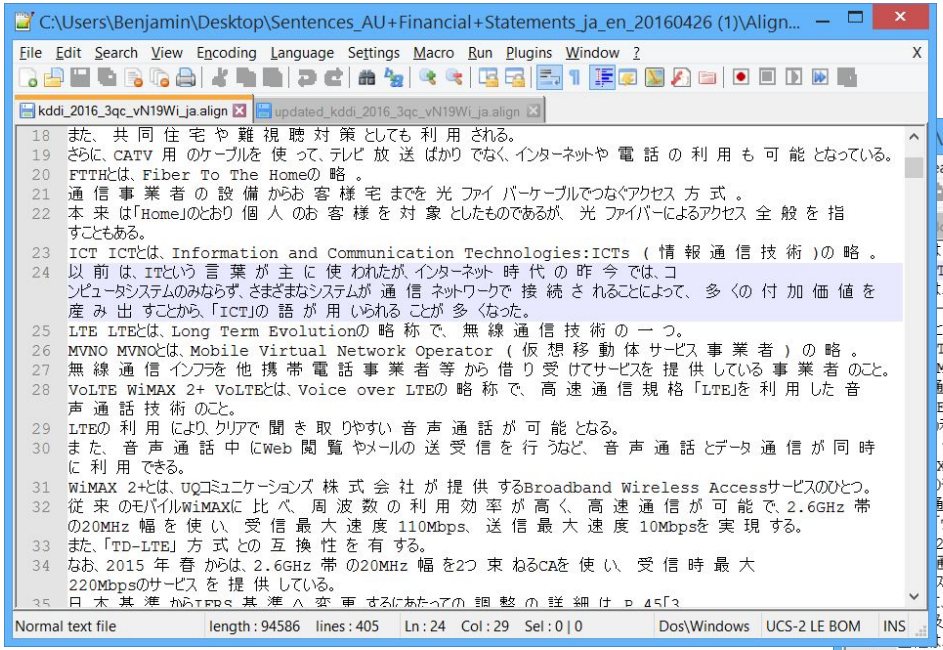
Things that worked: OCR, HTML files, cleaning out trash, monolingual docs

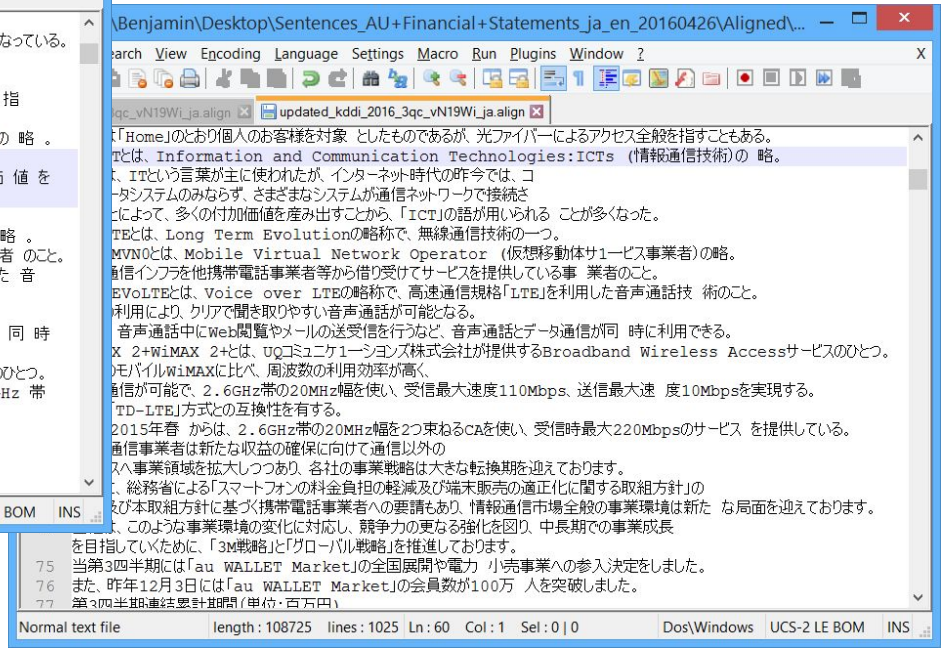
Things that didn’t: PDFs, and trying to align them

Goal Evaluation

- Quality
  - Not quite within our quality metrics
- Efficiency
  - Based on our initial pilot project and various assumptions
  - Approximately 85% (Goal was 70%)
- Price
  - Based on what we would be charging the customer/vendors, doesn't include training costs
  - Approximately 67% (Goal was 70%)
  - Depends on word count required to "break-even" based on training costs

Issues Faced

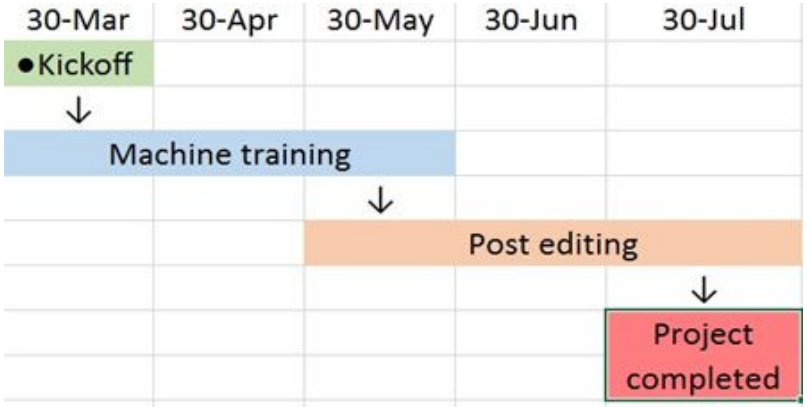




Recommendations

- Ask the client directly for source files
  - Ideally some form of inDesign or Microsoft Word document
  - Not PDF
- Adding more documents/segments to our training/tuning set
  - Find more related companies and their financial reports
- Alignment, lots of alignment
  - We did do some alignment but a large majority of our documents had alignment issues, so we were unable to do very many in the time available to us.
  - Should drastically improve results, but will take a lot of time and manpower
- Adding more monolingual texts and dictionaries
  - Specifically a dictionary of financial related terms that would likely appear in an annual report or other related financial documents.

Timeline/Costs



Task	Estimated Hours	Hourly Rate	Cost
Document alignment	40	$40.00	$1,600
MT training	12	$30.00	$360
Post-editing	8	$30.00	$240
QA	4	$30.00	$120
Total estimated project cost			$2,300

Lessons Learned

- Need to have easily accessible data (and lots of it)
- Training: Quantity > Quality
  - Use tools (eg, Olifant) not manpower to clean up
- Testing: Quality > Quantity
- Expert help
- One change at a time

(百万円未満四捨五入)	**Ref:** (Amounts are rounded off to nearest million yen) **MT:** (Rounded to the nearest million yen)
(1)連結経営成績(累計)(%表示は、対前年同四半期増減率)	**Ref:** COnsOlidated Operating Results(Percentage represents comparison change to the corresponding previous quarterly period) **MT:** (1) consolidated operating results (cumulative) (percentage represents comparison to previous fiscal year recorded in the same period decrease)
売上高営業利益税引前利益四半期利益親会社の戸:T期If#屑する四四半期鰭利益合	**Ref:** OperatingrevenueOperatingincomeProfit for the period before income taxProfit for the periodProfit for the period attributable to owners of the parentTotalcomprehensive income for the period **MT:** Door: period If of revenues operating income tax income before income quarter # waste to 44 quarter fin income total
百万円%百万円%百万円%百万円%百万円%百万円%	**Ref:** Nine-month period%%%%%% **MT:** Million yen % million: million yen million yen % million yen million yen %.
28年3月期第3四半期3,299,0313.8672,44211.0662,3709.0456,03216.9408,48613.4449,2439.6	**Ref:** ended December 31, 2015Nine-month period3,299,031 3.8672,44211.0662,370 9.0456,032 16.9408,486 13.4449,243 9.6 **MT:** 3/28 period no. 3 quarter 3299, 0313.8672 44211.0662 3709.0456, 03216.9408, 48613.4449, 2439.6
27年3月期第3四半期3,178,545—605,989—607,816—390,162—360,340—409,881—	**Ref:** ended December 31, 20143,178,545 -605,989-607,816 -390,162 -360,340 -409,881 - **MT:** 3/27 period no. 3 quarter 3178, 545 — 605989 — 607816 — 390, 162-360, 340 — 409881 —
基本的1株当たy四半期利益希薄化後1株当たy四半期利益	**Ref:** Basic earnings per shareDiluted earnings per share **MT:** Basic share this was y quarter income diluted shares into the y income
28年3月期第3四半期163.04ー	**Ref:** Nine-month period ended December 31,2015163.04- **MT:** 3/28 period no. 3 quarter 163.04 as
27年3月期第3四半期143.85—	**Ref:** Nine-month period ended December 31,2014143.85- **MT:** 3/27 period no. 3 quarter 143.85 —
(2)連結財政状態	**Ref:** (2) Consolidated Financial Positions **MT:** (2) consolidated financial position

Questions?